THE IRON TRADE REVIEW

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FALSE REPORTS

OF VERY LOW PRICES HAVE DEPRESSING EFFECT.

Concessions Not So General as Reported — Pig Iron Dull and Weak—Two Coke Contracts—New Furnaces.

Widespread and persistent publication of reports of very low prices on finished materials, particularly steel bars and structural shapes, has had a depressing effect, but favorable news is not entirely lacking. The leading tin plate interest is now operating 94 per cent of its capacity, and there is more activity in the western mills of the Steel Corporation than at any time since the panic, all departments at the South Chicago works and Joliet being in operation, and also the bar mills at Bay View. Eastern reports of large increases in orders have, however, little foundation. The confidence of lake interests in future prosperity is shown in the decision of the Detroit Iron & Steel Co., a Hanna interest, to erect a second blast furnace at Detroit, and in the letting of contracts by Corrigan, McKinney & Co., for a new furnace at Cleveland. The sale of $15,000,000 in bonds of the Jones & Laughlin Steel Co., insures a continuation of the extensive improvement program of that important interest, although it is not expected that a large amount of money will be spent immediately. Wage reductions are being made, and it is expected that further announcements will soon follow. For the most part, the men are accepting the new wage schedules. The Ensley steel plant will be closed about April 10.

Price Conditions

Careful investigation of reports of price concessions clearly shows that while some low prices are undoubtedly being made, they are not so easily obtained as would be indicated by rumors, some of which are rank exaggerations. Some contractors, who are in the market for large tonnages of shapes, have been unable to do better than 1.30c Pittsburg. There is much irregularity in the price of bar iron, which nets the manufacturers from 1.25c to 1.30c at their mills, delivered prices being made according to the necessities of competition. The cotton tie market has opened at reduced prices. Wire orders have decreased, as usual at this time of the year.

March bookings of structural shapes amounted to about 100,000 tons, of which about one-half went to the American Bridge Co. This total does not include some 13,000 tons of bridge material. Contracts just taken by the leading interest include the Ball Realty building, New York, 2,000 tons, and 3,000 tons of railway bridge work.

Steel Rail Orders

The Chicago City Railways Co. has placed a contract with the Lorain Steel Co. for 22,000 tons of girder rails, and orders amounting to 20,000 tons of open-hearth rails to be rolled at the Gary plant have been booked. The Pennsylvania Steel Co. has taken an order for 4,500 tons of girder rails for the Milwaukee Light & Power Co., and other orders amount to about 18,000 tons. An order for 5,000 tons for the Havana Central Railroad was placed abroad. The Grand Trunk Railway has ordered 4,000 tons from the Dominion Iron & Steel Co. A contract for 45,000 tons of cast iron pipe for the city of San Francisco has been awarded to the United States Cast Iron Pipe & Foundry Co., which has also taken contracts for 6,000 tons at Pittsburg, 3,600 tons at Rochester, and 500 tons at Chelsea, Mass. The demand for merchant pipe is improving. It is expected that some large orders will soon be placed. The demand for boiler tubes is very moderate. A fair amount of business is being received by the plate mills.

Pig Iron Is Dull

Following the placing of the contract for cast iron pipe for San Francisco, the leading pipe interest has purchased about 40,000 tons of southern pig iron, but the market in that section, as well as elsewhere, is dull, the southern price having settled to $11 Birmingham for No. 2, while Virginia irons are selling at $13.50 at the furnace; eastern Pennsylvania No. 2X at $15.25, and foundry No. 2 at $14.50 valley. An order for 2,000 tons of basic has been placed at St. Louis, and one for 3,600 tons of Bessemer at Pittsburg, but the market in steel making irons is very dull. Cleveland furnace interests have placed orders for second half coke requirements amounting to about 200,000 tons.

LATE PITTSBURG NEWS.

(Special Telegram.)

Pittsburg, March 31.—The Crucible Steel Co., of America, has made a contract for 3,600 tons of prompt Bessemer pig iron. The United States Steel Corporation has formerly supplied the company with iron under the Clairton mill deal.

Five hundred tons of No. 2 foundry has been sold at $14.50 valley. An eastern furnace is in the market for 144,000 tons of coke, for delivery at the rate of 12,000 tons per month, beginning with July.

The Carnegie Steel Co. has blown in another furnace at Edgar Thomson, making 36 out of 59 stacks in blast.

Rumors of further wage reductions are current, and announcements are expected to come at any time.

The cotton tie market has opened, and shipments both direct and to warehouse are being made. No prices are announced, owing to the open market conditions, but quotations are lower than last year, and irregular. Last quotations were on the basis of 85 cents for 3,000 bundle lots, and 88 cents for less than 3,000.

THE WEEK IN IRON CENTERS

PITTSBURG.

Fair Business In Finished Materials—Pig Iron Is Dull.

Office of THE IRON TRADE REVIEW, 510 Park Bldg., March 30.

Despite the reports of extremely low prices being made in some finished lines, notably structural shapes and steel bars, the mills continue to act well in line with one another in the solicitation and booking of business. Although the open market offers the opportunity for attractive orders to command concessions in competition, there is no evidence to show that such shading is unnecessarily severe or in complete disregard of production costs. Some cutting has undoubtedly been done and is still under way, but it is a question if the deepness of it is not being overdrawn at times.

The mills are getting a fair amount of business in bars, plates, shapes and merchant pipe. Tin plate operations have increased rapidly during the past several weeks and the American Sheet & Tin Plate Co. is now running 94 per cent of its serviceable capacity. General conditions, however, are scarcely up to the point at which the market broke in February, and it remains to be shown by further lapse of time whether any considerable volume of new business will be stimulated by the reduced price level.

The pig iron market remains dull and considerable merchant production continues in the Mahoning and Shenango valleys in the face of heavy stocks in these districts, which are increasing. Unless the demand for iron shows a material improvement in the very near future, a sharp curtailment of operations promises to be forced. Some furnaces which for months have been piling their yards with metal are now blowing out.

The expected readjustment of steel works and blast furnace wages in the Pittsburg district, Mahoning and Shenango valleys, was inaugurated the past week, when notices of reductions were posted by the Republic Iron & Steel Co., and the Shenango Furnace Co. Both provide for a practically 10 per cent cut which is effective April 1. Other steel companies and merchant blast furnace interests in these districts are expected to shortly take similar action and a general reduction is thought to be in prospect.

Pig Iron.—A greater inclination toward weakness is shown in pig iron, although the transactions through which conditions are expressing themselves are not sufficient to show the true levels of the market. Makers are facing the problem of heavy stocks being constantly increased, and of unsettled prospects as to when the market will be able to absorb this surplus tonnage. The stocks of iron in the Mahoning and Shenango valleys are known to be quite large and although nothing has yet come of the movement to close the merchant furnaces in these districts for a period of 60 days, it is expected that a continuation of present conditions will force a gradual curtailment of production. The Clinton Iron & Steel Co. in this city, which has been piling iron for months, is preparing to blow out this week. The fires have been lighted in the rebuilt No. 3 Shenango furnace in the Shenango valley and it is expected to be making iron some time in April. The latter stack will run against some long-term contracts, however.

A local steel company in the week came into the market for 3,600 tons of Bessemer for April shipment and has received some low quotations. The present range on Bessemer is from $15 to $15.25 valley, and on basic from $14.50 to $14.75 valley. Malleable is quoted from $14.50 to $14.75 valley. In No. 2 foundry, small sales are being made around the $14.50 basis where the market is fairly steady. Forge is nominal at $13.50 to $13.75 valley.

The Commonwealth Steel Co., St. Louis, has closed on its inquiry for 2,000 tons of basic, the sale going to western furnaces. The International Harvester Co. has awarded a portion of the 5,200 tons of malleable and foundry for which it was inquiring for Auburn, N. Y., and Hamilton, Ont. Though furnaces are not desirous of quoting on last half delivery, a small sale of No. 2 at $15.75 furnace for this shipment is reported.

On prompt and second quarter shipment on northern iron, we quote as follows:

Bessemer, valley	$15.00 to 15.25
Bessemer, Pittsburg	15.90 to 16.15
No. 2 foundry, Pittsburg	15.40 to 15.65
Gray forge, Pittsburg	14.40 to 14.65
Basic, valley	14.50 to 14.75
Basic, Pittsburg	15.40 to 15.65

Ferro-Alloys.—Consumers of ferro-manganese in this district are well covered up to the middle of the year, but there is some inquiry from other districts. Low prices are reported on 50 per cent ferro-silicon, but the general market remains nominal in tone.

We quote 80 per cent ferro-manganese at $42 to $43 Baltimore, with a freight rate of $1.95 to Pittsburg.

Imported 50 per cent ferro-silicon is quoted at $60.50 to $61 Pittsburg on forward deliveries; domestic, 12 per cent, $26; 11 per cent, $25; 10 per cent, $24, Pittsburg.

Plates.—Makers generally are not willing to make contracts on plates for delivery beyond July at present prices, and as a consequence current orders are coming from work actually under construction. The car companies are operating in a moderate way, but prospects for additional business in this line are not improving. Mill operations are not changing in any perceptible degree. While the 1.30c Pittsburg price does not represent the basis for all transactions and varies at times according to freights from mills to delivery points, this quotation continues the market and is reasonably firm within the zone of the Pittsburg mills. We quote the present plate market as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.30c f. o. b. mill. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 110 inches up to 115 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16-inch to and including No. 9, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Considerable business is being placed in sheets, but the market is disturbed by price shading in which some interests are quite aggressive. The cutting is mainly in the galvanized and corrugated grades, as the business being offered in black sheets is not especially heavy or attractive, and usually it has been about $1 a ton. The heavier gages of blue annealed sheets are not in demand, as at 1.60c they cannot compete with such gages of plates at 1.30c. The leading interest this week is running 59 per cent of its mills compared with 58 per cent last week and 50 per cent the preceding week. The

activity of the independents is showing little change. We quote the following minimum prices on sheets:

Blue annealed sheets, Nos. 10 and heavier, 1.60c; Nos. 11 and 12, 1.65c; Nos. 13 and 14, 1.70c; Nos. 15 and 16, 1.80c; box annealed sheets, Nos. 10 to 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 1.95c; Nos. 17 to 21, 2c; Nos. 22 to 24, 2.05c; Nos. 25 and 26, 2.10c; No. 27, 2.15c; No. 28, 2.20c; No. 29, 2.25c; No. 30, 2.35c; galvanized sheets, Nos. 13 and 14, 2.30c; Nos. 15 and 16, 2.40c; Nos. 17 to 21, 2.50c; Nos. 22 to 24, 2.65c; Nos. 25 and 26, 2.85c; No. 27, 3.05c; No. 28, 3.25c; No. 29, 3.35c; No. 30, 3.60c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—The mill activities of the American Sheet & Tin Plate Co. are closely approaching the normal stage. This week the company has 201 mills in operation out of a serviceable capacity of 213 mills, the Demmler works being the only operative plant not running, and this is to be started in a short time. The activity of the company is now at 94 per cent of the serviceable equipment, or 83 per cent of its total capacity of 242 mills, but four of the smaller plants with 29 mills have not been operated even in the most active seasons. The latest plants to be started in the past week were the La-Belle, 10 mills, and Pittsburg, eight mills. Most of the independent plants are also running full. The active consumptive season in tin plate is bringing heavy specifications to the mills for delivery up to July. Some contracting is now being done for third quarter. Prices are well maintained. We quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.45 f. o. b. mill Pittsburg district and $3.40 in large lots. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—Several steam line projects are now under negotiation and some definite announcements may be made shortly. The Carnegie Steel Co. during the week received a release of 3,000 tons of standard sections against an old contract, and booked about 1,200 tons of light rails. Orders against recent standard contracts are on the books and the Edgar Thomson mills are running at their gait of the past several months. There is a proportionately better buying of track fastenings than of steel rails, showing considerable repair work on the part of the railroads. Light rail prices are not changing. On present specifications on Bessemer rails, we quote as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $32; 12-pound, $28; 16-pound, $26; 20-pound, $25; 25 to 45-pound, $24; angle splice bars for standard sections, 1.50c. Standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—The $23 Pittsburg price on billets appears quite firm. Some consumers have found themselves unable to obtain concessions and the mills report transactions at full figures. There is some inquiry from other sections, but new business in the Pittsburg district is light. Sheet and tin bar prices are not so firmly held and some instances of shading are reported. The mills of the Carnegie Steel Co. are getting better specifications, which are mainly due to the greater activity of the American Sheet & Tin Plate Co., and this week resumed operations at its South Sharon works, rolling sheet bars. Specifications against forging billet contracts are good.

Bessemer and open-hearth 4 x 4 billets with 0.25 carbon and less are quoted at $23 Pittsburg, with the usual extras for size and analysis, and forging billets at $25 Pittsburg. Sheet and tin bars are $25 Pittsburg. Some steel makers are still willing to divide the freight within the $1 limit, making the price in the immediate Pittsburg territory $23.50 delivered on billets and $25.50 delivered on sheet bars.

Hoops and Bands.—There is a fair run of specifications against hoop contracts and a little contracting is being done, but the market is devoid of special features. We quote present prices as follows:

Hoops in carload lots, 1.60c; in less than carload lots, 1.70c; bands, 1.20c, base half extras as per standard steel.

Merchant Bars.—Makers of steel bars unite in denying that a price of 1.10c Pittsburg as reported has been made on this material, and declare that 1.20c still represents the general market. While attractive tonnage of desirable size and delivery will likely command concessions from this price, and this is especially true in the case of re-rolling mills, it is not established that any extreme shading is being done. Some business is being regularly placed at the full 1.20c basis. There has been some contracting by the implement consumers for six months ahead at the present level, and others of this class of buyers are being negotiated with. Specifications have been coming to the mills in good volume during the past month. The mill price on bar iron in this district continues around 1.35c, making the quotation for Pittsburg delivery, 1.35c to 1.40c. There is a light demand. We quote present prices as follows:

Common iron bars, 1.35c to 1.40c Pittsburg, Bessemer and open-hearth steel bars, 1.20c; plow and cultivator, 1.20c; channels, angles, zees, tees under 3-inch, 1.30c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 60 per cent in carloads, and 55 per cent in less than carloads, delivered in base territory. Planished and machine straightened tire steel is 1.40c base; iron finished tire under 1½ by 1½ inches, 1.35c, both plus ½ extra on tire card; iron finished tire, 1½ by ½ and over, 1.20c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material.—Pittsburg mills disclaim any knowledge of the extremely low prices on structural shapes which have been currently reported and after investigation in some cases have attributed the basis for such reports to the state of the fabricated material market, wherein certain interests have shown a willingness to sacrifice fabrication costs to get business. Very low prices are being named by fabricators in frequent instances, some in the anticipation of obtaining sharp concessions on steel, but the fact remains that there are striking examples where the companies so acting have not been able to cover for their needs at advantage and are still shopping in the market for their shapes. Owing to the nature of the open market, it cannot be said that the 1.30c Pittsburg price is firmly observed in all cases, but it reasonably represents general market, and concessions are not unnecessarily heavy. It is stated that some large tonnages have been declined at the 1.25c price. There is a fair inquiry, much of which is from the railroads, but contracts from the latter are not many. The New York Central budget of about 26,000 tons of bridge material is for five years' delivery and fabricators will ask advanced prices owing to the extended

shipment.. No local contracts have been placed this week, but tentative bids have been taken for the proposed club house of the Pittsburg Athletic Association, 1,400 tons. We quote the present market as follows:

Beams and channels, 15-inch and under, 1.30c; over 15 inches, 1.40c; zees, 1.30c; tees, 1.35c; angles from 3 to 6 inches, 1.30c; over 6 inches, 1.40c; universal and sheared plates, 6¼ inches and wider, 1.30c base.

Merchant Pipe.—Conditions in merchant pipe show improvement and the market has a sound outlook, although the jobbers are disposed to proceed cautiously with their orders. Prices in merchant pipe are stable. Some of the large line pipe projects in the market are progressing favorably, but no additional awards of prominence have been made. Spang, Chalfant & Co., Inc., this week started their large mill which produces sizes over 12 inches, and are now working upon a very large order for 16-inch line pipe. The mill will be engaged for several months in the execution of this contract. We quote the following official discounts on merchant pipe subject to five off to jobbers, while a few of the very large jobbers with mill connections are given an additional one point off:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	72	56	69	..
⅜ inch	73	59	70	56
½ inch	76	64	73	61
¾ to 6 inch.....	80	70	77	67
7 to 12 inch.....	75	60	72	57
PLUGGED AND REAMED.				
1 to 4 inch.....	78	68	75	65
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	65	53	62	50
½ to 4 inch.....	72	60	59	57
4½ to 8 inch.....	68	56	65	53
DOUBLE EXTRA STRONG PLAIN ENDS.				
⅛ to 8 inch.....	61	50	58	47

Boiler Tubes.—There has been some buying of merchant and locomotive tubes in a quiet way during the past month, and some mills now have a fair tonnage on their books. The general tone of the market however is one of moderate trading. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch	50
1¾ to 2¼ inch	62
2½ inch	64
2¾ to 5 inch	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.
2¾ inch and larger, over 22 feet, 10 per cent net extra.
To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following discounts on charcoal iron tubes to jobbers:

1 to 1½ inch.....	45
1¾ to 2¼ inch.....	45
2½ inch	50
2¾ to 5 inch	57
6 to 13 inch	45

Wire Products.—Some independent interests which booked considerable business at concessions for prompt shipment, are receiving liberal specifications and are finding difficulty in making desired deliveries. Shipments in barb wire are especially retarded. Beyond such covering of immediate needs, there has not been a great deal of buying, as consumers are reluctant to contract because of the expectation of lower prices. Some companies are not actively soliciting trade on account of the unsettled outlook. Although there are reports of occasional shading the market seems well held as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c, and to retailers in carloads, 1.85c.

Wire Rods.—No transactions are being put through in wire rods, and the market continues nominal at $33 Pittsburg on Bessemer and $34 Pittsburg on open-hearth rods.

Coke.—The coke market continues dull, and, as production is showing little change, there is considerable spot material which is being offered at low prices. Good Connellsville foundry coke has been offered as low as $1.80 for prompt shipment and furnace coke around $1.50 ovens. The Westinghouse Electric & Mfg. Co. is in the market for its yearly requirements of foundry coke beginning July 1, 1909. We quote spot furnace coke at from $1.50 to $1.75 ovens and on contract from $1.75 to $1.90 ovens. On first class Connellsville foundry coke the range is from $1.80 to $2 for prompt shipment and on contract around $2.25. The *Courier's* figures for the week ending March 20 show 23,122 ovens active with an output of 251,261 tons, compared with 22,836 active ovens and a production of 252,617 tons the previous week.

Old Material.—The demand for old material is light and the current buying is largely by a few interests which are operating quite steadily. At the same time, the offerings of accumulated material are very moderate and dealers are uniformly holding to their stocks to save themselves from financial loss at present prices. Lower quotations are being made on the going business and the market continues to sag. The general sentiment is towards weakness. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $14 to $14.25; rerolling rails, $14.25 to $14.50; bundled sheet scrap, $11.25 to $11.75; iron axles, $18 to $19; old iron rails, $15 to $16; No. 1 wrought scrap, $13.25 to $13.75; old car wheels, $14 to $14.50; low phosphorus, $16 to $16.50; machine shop turnings, $8.50 to $9; cast borings, $7.50 to $8; No. 1 cast scrap, $13.50 to $14; malleable, $13 to $13.50; stove plate, $10.50 to $11.

CHICAGO.

Exaggerated Rumors of Price Cutting —Heavy Sales of Southern Pig Iron.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, March 30.

Buyers of iron and steel mill products and pig iron are giving their most serious attention at present to the many rumors of lower prices. There has developed a distinct unsettling of sentiment as a result and there is apparently less faith in the immediate situation with regard to prices than at any time since the general reductions. The movement of business is adversely affected in consequence. There is good reason to believe, even though there may be here and there a foundation in truth for reports of prices in this market as low as rumored, that the reports absolutely do not represent open market conditions. A variety of sources of information fails to yield any corroboration of the report that a price is being made at Chicago for steel bars equivalent to $1.10 Pittsburg. More than this, the western mills are not eager to negotiate for next year's steel bar contracting, although such negotiations are under way in several instances, and there is apparently no occasion for shading the $1.35 Chicago price that has been made, though that may have been done for some current orders. There are instances of irregularity in prices undoubtedly in an energetic campaign for business such as is being waged at present and buyers are using the best price offered to them as a lever to bring out a better offer. The proportion of activity of the various mills in this territory indicates, however, very clearly, with the exception of the leading interest, that the ruling purpose is to hold customers with the least possible sacrifice rather than to fill up order books. The situation here is distinctly better with regard to prices than in the east.

The past week was prominent especially with regard to rail tonnages. A contract for 22,000 tons of girder rails for the Chicago City Railways Co. was placed with the Lorain Steel Co. The leading interest took orders during the week for about 20,000 tons

of open-hearth rails which will be rolled at the Gary plant. The leading interest reports that its western mills are running fuller than at any time since the panic, all departments at South Works and Joliet being in operation and the bar mills at Bay View being all on. The 45,000-ton cast iron pipe contract at San Francisco was let last week to the leading interest and will be filled in the south. Deliveries are to be completed within a year. Attendant upon this were large sales of iron in the south, a total of more than 40,000 tons being reported. The pig iron market is very weak notwithstanding.

Pig Iron.—In the south upwards of 40,000 tons of iron were sold during the past week, the purchases being associated in part with the letting of the 45,000-ton pipe contract in San Francisco. This buying did not serve to stimulate southern prices, however, and $11 Birmingham was freely made on such lots as were sold. A price of $10.50 is currently rumored, but although $11 is made on what might not be considered desirable business, there is no evidence that $10.50 has been offered for No. 2 iron. In this market, the tonnages are all restricted to a maximum of a few hundred tons with deliveries chiefly for the second and third quarters, though some business has been placed for last half. There is considerable inquiry for iron to cover last half requirements and it seems likely that a round tonnage will be engaged for that period, should a special price lower than $11 be offered. Quotations for last half are not being freely made and some interests are not yet ready to name their price. Sales of small lots aggregating some 1,500 tons were made in this market for delivery through the third quarter at $11; a few hundred tons for prompt shipment brought as high as $11.50. One large southern interest operating merchant furnaces reports sales amounting to 12,000 tons. The price is understood to have been $11. The local situation is very dull. It would not be surprising, if present conditions continue very much longer to witness the blowing out of one of the local stacks. We quote as follows:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	17.00 to 17.50
Northern foundry No. 2	16.50 to 17.00
Northern foundry No. 3	16.00 to 16.50
Southern foundry No. 1	15.85 to 16.35
Southern foundry No. 2	15.35 to 15.85
Southern foundry No. 3	14.85 to 15.35
Southern foundry No. 4	14.35 to 14.85
Southern No. 1 soft	15.85 to 16.35
Southern No. 2 soft	15.35 to 15.85
Southern gray forge	13.85 to 14.35
Southern mottled	13.60 to 14.10
Southern silveries, 4 per cent silicon	17.60 to 18.10
Southern silveries, 5 per cent silicon	18.10 to 18.60
Southern silveries, 6 per cent silicon	18.60 to 19.10
Jackson Co. silveries, 6 per cent.	19.40 to 19.90
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Jackson Co. silveries, 10 per cent	21.40 to 21.90
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	17.40 to 17.90
Alabama basic	16.85 to 17.35

Billets.—The few lots of billets that are being sold bring the full price of $28 Chicago for forging billets. There are no large transactions and there is practically no agitation of the price question. We quote nominally for Chicago delivery: 4 x 4-inch rolling billets $26; forging billets $28.

Merchant Bars.—In this market the question of the price of iron and steel bars is undoubtedly the matter most frequently encountered. Of iron bars, it may be said that all of the western manufacturers are trying to make $1.30 Chicago the low mark. Prices 50 cents a ton below that are reported, but still lower prices are also reported for which there is no confirmation. According to reliable information, the negotiations which are now in progress with a view to placing next years' steel bar contracts have not yet resulted in the closing of any. The leading interest reports sales of 8,000 tons during the week and other reports are made indicating that the western business is moving in its accustomed channels. From this it may be gathered that there is existing in this market no reason because of either local or eastern competition for departing materially from the steel price of $1.35 Chicago. No confirmation appears establishing the fact of lower prices than this having been made here or for any consumer who buys here. Active competition is in progress with regard to hard steel angles and some low prices have been made. At Chicago, $1.20 has been approached. We quote as follows:

Bar iron, 1.30c; soft steel bars and bands, 1.35c half extras; soft steel angles, less than 3 x 3, 1.48c; hoops, 1.78c base, full extras; planished or smooth finished tire steel, 1.58c; iron finish, up to 1½ x ½-inch, 1.53c base tire card; iron finish, 1½ x ½-inch and larger, 1.38c base steel card; channel for solid rubber tire, ¾ to 1 inch, 1.88c and 1⅛-inch and larger, 1.78c; smooth-finished machinery steel, 1.63c; flat sleigh shoe, 1.43c; concave and convex sleigh shoe, 1.63c; cutter shoe, 2.75c; toe calk steel, 1.93c; railway spring, 1.73c, base steel card; vehicle spring steel, 1.78c base vehicle card; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c to 1.90c, full extras; soft steel bars, 1.60c per 100 pounds base, plus half extras; soft steel hoops, 2.10c full extras.

Plates.—The volume of plate orders being taken by the leading interest continues excellent. The capacity for furnishing all sizes of plates is limited locally and the leading interest under present conditions is more than ordinarily well favored with business. Both of its south works mills are in operation. The current price is $1.45 Chicago, except where competition with water freight rates is met, under which circumstances as low as $1.42 has been made. For mill prices, see Pittsburg report. Freight to Chicago, 18 cents. We quote from local stocks as follows:

Tank steel, ¼-inch and heavier, up to 72 inches wide, 1.70 to 1.80c; from 72 inches wide to 96 inches wide, 1.80c to 1.90c; 3/16-inch up to and including 60 inches wide, 1.80c to 1.85c; 72 inches wide, 2.05c to 2.10c; No. 8 up to 60 inches wide, 1.80c to 1.85c. Flange and head quality, 25c extra.

Sheets.—There has been no setback to the sheet trade. The local mill is well filled up and there is a good prospect of one of the Indiana mills, which had been shut down, resuming. Locally, the irregularity in prices, while still existing, is not so marked. For mill prices, see Pittsburg report. Freight to Chicago, 18 cents. We quote store prices at Chicago as follows:

Store prices at Chicago: No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18-20, 2.50c to 2.55c; Nos. 22-24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.75c to 2.80c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 to 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.25c; No. 26, 3.40c to 3.45c; No. 27, 3.60c to 3.65c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.50c.

Structural Steel.—The week was exceedingly bare of contracts. A number of projects, the placing of which was expected, were held over. The contract for the Johns-Manville warehouse at Milwaukee, carrying 1,100 tons, was placed with the American Bridge Co. It is reported of that contract that between the low bidder and

the fifth was a difference of $20,000. The Kohler-Chase building in San Francisco was let to Milliken Bros. It will require 486 tons. Bids will be received in a few days for the Steger building in Chicago, in which there will be about 2,000 tons, and for the Northern Trust Co. building, requiring 300 tons. Construction work on the new McCormick building is to begin in a week. The limited number of mills in this territory reduces very greatly the occasion for the serious price conflict that is being waged in the east on plain material, but the prices at which fabricating material is being turned out are discouragingly low. For mill prices on plain material, see Pittsburg report. Freight to Chicago, 18 cents. We quote for delivery from local jobbers' stocks as follows:

All angles, 3 inches and larger, including 6 inches, $1.70 per 100 pounds; angles over 6 inches, $1.80 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.70 per 100 pounds, base; channels, 3 inches and larger, $1.70 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—The past week brought out a fair tonnage of standard section rails. The Chesapeake & Ohio increased its order of 7,500 tons to 8,500 tons, a northern trans-continental road ordered 12,000 tons, the Lake Shore & Michigan Southern ordered 3,500 tons, and the Twin City Rapid Transit Co. ordered for its Duluth & Superior traction lines 1,100 tons. All of these rails are to be from open-hearth steel and will be rolled at Gary. They are for prompt shipment. The Chicago City Railways Co. placed an order for 22,000 tons of girder rails with the Lorain Steel Co. The placing of an additional 5,000 tons during the present week is expected. Beyond this the future offers a rather dull prospect. Light rail business is poor and concessions of $1 a ton rule. Specifications for track supplies are good and the mills are running full. For standard sections see Pittsburg report. We quote as follows:

Light rails, 25-pound to 45-pound, $24; 20-pound, $25; 16-pound, $26; 12-pound, $27. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.20c; with hexagon nuts, 2.30c to 2.40c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Merchant Pipe and Boiler Tubes.—A distinct improvement in the volume of pipe tonnage is noticeable. While not as substantial in character as might be desired, it is encouraging. Jobbers are buying moderately, covering the requirements of about 30 days. The demand for tubing is very dull. For mill discounts see Pittsburg report.

Cast Iron Pipe.—A satisfactory railroad rate of $11 having been made to the city of San Francisco, the contract for 45,000 tons of pipe in sizes from 8 to 20 inches was placed with the United States Cast Iron Pipe & Foundry Co. The letting of the Cheyenne contract for 10,000 tons of pipe from 16 to 30-inch, is the only other pipe contract of interest now pending. Prices are firmer and we quote as follows: 4-inch water pipe, $27.50; 6 to 14-inch, $26.50; larger sizes, $25.50; gas pipe, $1 a ton higher.

Wire Products.—The price situation in wire products has steadily improved as a result of the generous tonnage moving. There are out no longer definite offers of less than regular prices, though some small irregularities continue to crop out. While the aggregate tonnage of business cannot be compared with that of large years, it is very satisfactory and is well balanced in all lines of wire goods. We quote as follows:

Wire nails, jobbers' carload lots, $2.13; retailers' carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.28; retailers' carload lots, $2.33, with 30c for galvanizing; plain wire to jobbers in carloads, $1.98, and to retailers in carloads, $2.03. Wire rods, Bessemer, $33; open-hearth, $34; chain rods, $33, f. o. b. Pittsburg.

Old Material.—Such support as the scrap market receives comes from prices that are made in buying to complete former contracts. Such contracts made at higher prices than are now current permit buying by the dealers at the top of the present market. Otherwise the market is so dull as scarcely to maintain present levels. The railroad offerings of scrap include 4,600 tons by the Great Northern, which lot includes 1,300 tons of wrought and 1,500 tons of re-rolling rails, and small quantities by the Chicago, Rock Island & Pacific and the Santa Fe. We quote gross tons in the first paragraph, as follows:

Old car wheels	$14.00 to 14.50
Old iron rails	15.75 to 16.25
Re-rolling rails (4 ft. and over)	12.75 to 13.25
Old steel rails (4 ft. and under)	13.50 to 14.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	12.25 to 12.75
Heavy melting steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.25 to 11.75
No. 2 R. R. wrought	10.25 to 10.75
Knuckles, couplers and springs	11.00 to 11.50
Shafting	15.25 to 15.75
Iron car axles	16.00 to 16.50
Steel car axles	15.75 to 16.25
Dealers' forge No. 1	9.50 to 10.00
Pipes and flues	8.50 to 9.00
No. 1 cast, 150 lbs. and less	12.00 to 12.50
No. 1 mill	7.00 to 7.50
Mixed busheling (Nos. 1 and 2)	7.00 to 7.50
Country sheet	5.00 to 5.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	11.00 to 11.50
Cast borings	7.00 to 7.50
Mixed borings, etc.	7.00 to 7.50
Machine shop turnings	6.50 to 7.50
Railroad malleable	10.50 to 11.00
Agricultural malleable	10.00 to 10.50
Stove plate and light cast scrap	11.00 to 11.50
Old iron splice bars	13.50 to 14.00

CLEVELAND.

Business in Steel Products Shows Increase—Pig Iron Dull.

Office of THE IRON TRADE REVIEW,
Browning Bldg., March 30.

Iron Ore.—No sales are reported, and it is not expected that any will be made while the uncertainty as to the tariff continues. Some interests report very good movement of ore from docks to furnaces. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—The market is at a standstill, and practically no business is being transacted in this district. Local prices have not been tested, but the tendency in the valley is downward. We quote delivered in Cleveland as follows:

No. 1 foundry	$15.50 to 15.75
No. 2 foundry	15.00 to 15.25
No. 3 foundry	14.50 to 14.75
No. 2 southern	15.35 to 15.50
Gray forge	13.75 to 14.00
Bessemer	16.25 to 16.50
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—One furnace interest has contracted for its requirements for the last half, amounting to about 150,000 tons, and another furnace interest has contracted for its requirements for the same period amounting to about 50,000 tons. No transactions of importance in foundry coke are reported. Spot furnace coke we quote at $1.50 to $1.65 at the ovens, and on contract, $1.65 to $1.75. For first class Connellsville foundry coke, we quote on shipments up to the second half, $2 to $2.25.

Finished Material.—Mill agencies report a very gratifying increase in demand for steel products, business for March being far ahead of that for January and February, when the market was extremely dull. The order for the steel for the building of the Brotherhood of Locomotive Engineers, about 2,500 tons, has not yet been placed, as sellers have not been willing to shade the 1.30c Pittsburg price. This building will require

about 200 tons of concrete reinforcing bars for the foundation. The contract for the stack and stoves for the new furnace of Corrigan, McKinney & Co. has been awarded to the Variety Iron & Steel Works Co. About 700 tons of plates and shapes will be required. On steel bars the market is firm at 1.20c Pittsburg. The Empire and Union rolling mills are not in operation this week, and the bar iron market is very dull. The price varies in accordance with the necessities of competition. Structural material is quiet, but it is expected that several thousand tons will be placed at an early date.

Old Material.—Small quantities of material are passing from dealers to consumers and the market is as dull now as it has been at any time in the past year. A few changes in prices have been made, and we quote the following prices f. o. b. Cleveland, largely nominal, however:

Old iron rails	$15.00 to 15.50
Old steel rails (re-rolling)	14.00 to 14.50
Old steel rails (under 6 feet)	14.00 to 14.50
Old car wheels	14.50 to 15.00
Old steel boiler plate	11.00 to 11.50
Malleable iron (railroad)	13.00 to 13.50
Steel axles	17.50 to 18.00
Malleable iron (agricultural	11.50 to 12.00
Heavy steel	12.50 to 13.00
Country mixed steel	11.00 to 11.50
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.00 to 12.50
No. 1 busheling	10.00 to 10.50
No. 1 machine cast	12.50 to 13.00
Iron axles	16.00 to 16.50
Axle turnings	8.50 to 9.00
Machine shop turnings	7.00 to 7.50
Grate bars	10.50 to 11.00
Pipes and flues	10.00 to 10.50
Tank iron	9.00 to 9.50
Hoop and band iron	7.00 to 7.50
Sheet iron	5.50 to 6.00
Wrought drillings	7.00 to 7.50
Stove plate	11.00 to 11.50
Cast borings	6.00 to 6.50

CINCINNATI.

Pig Iron Quoted at $11 for Delivery Through the First Half.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., March 30.

Pig Iron.—The development of most interest during the week, has been the establishing of $11 Birmingham as the inside quotation for southern iron. This price is openly quoted for prompt shipment and for April, May and June, but it is not clearly established that extended deliveries will be taken on at this price. It has been considered probable for the past several weeks that the market would reach this point and the question of most interest now is as to whether the bottom has been reached. One of the largest producers in the south and one of the best located furnaces is credited with having stated that it will blow out rather than take last half business at $11 Birmingham. Another large producer has enough orders on its books to last for some time and refuses to meet the market, believing in a quick recovery. With two large producers maintaining this attitude and the fact that the market in the south is low enough to open up a large territory to southern iron against northern furnace competition, it seems to be trade opinion that a further decline is not warranted by conditions, although with a continued dull market it is difficult to forecast what may occur. There has been practically nothing to test prices for northern iron in the Ironton district for the past two weeks, but it is believed that $14 at furnace can be done, although some of the stacks continue to pile iron and refuse to accept less than $14.50 and $15. Considerable iron has accumulated at southern Ohio furnaces. The buying during the week has been light. An eastern cast iron pipe maker has made a firm offer for 3,000 tons of gray forge and No. 4 foundry at $10 Birmingham, for prompt shipment. The offer has been accepted, provided deliveries can be extended over April and May. An Ohio pipe manufacturer is in the market and is likely to close for from 1,000 to 4,000 tons provided satisfactory terms can be made. A local foundry has made a bid of $11 Birmingham for 1,000 tons of No. 2 foundry for last half delivery. In a general way, however, buyers are more or less complacent, which is confirmatory of the general belief that they are fairly well covered for the third quarter. We quote for prompt delivery delivered Cincinnati, based on freight rates of $3.25 Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.25 to 13.75
Southern No. 1 soft	14.75 to 15.25
Southern No. 2 soft	14.25 to 14.75
Southern gray forge	13.25 to 13.50
Northern No. 1 foundry	15.70 to 16.20
Northern No. 2 foundry	15.20 to 15.70
Northern No. 3 foundry	14.70 to 15.20
Northern 8 per cent silicon	19.70

Finished Material.—Rumors of price cutting in steel bars and structurals have been heard in this territory, but are not fully confirmed. Dealers and mill agents continue to assert that previous Pittsburg basis prices represent the market, but buyers claim to have been able to beat open quotations considerably.

Coke.—Prices remain unchanged and the volume of business is about the same as in the past several weeks. There is talk of some furnaces blowing out due to the depression in pig iron prices; but this is not expected to affect coke prices, as the ovens would be likely to follow the furnaces in shutting down. Prompt shipment coke continues to be quotable at the inside figures given below; and the ovens are asking about the top quotations on long time contracts. Quotations in the leading coke producing districts are as follows:

	PER TON.
Wise county furnace coke	$1.60 to 1.90
Wise county foundry coke	2.00 to 2.25
Pocahontas furnace coke	1.65 to 1.85
Pocahontas foundry coke	1.85 to 2.25
Standard Connellsvills furnace coke	1.50 to 2.00
Standard Connellsville foundry coke	1.90 to 2.50

Old Material.—Some improvement in demand has given the market a slightly steadier tone, but prices are not quotably changed. The market continues irregular and unsettled at about the following quotations:

Old No. 1 R. R. wrought, net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.00 to 13.50
Old iron rails, gross tons	15.50 to 16.50
Old steel rails (re-rolling) gross tons	12.50 to 13.50
Old short lengths, gross tons	12.00 to 13.00
Old iron axles, net tons	15.00 to 16.00
Heavy melting scrap, gross tons	12.00 to 12.50
Stove plate, net tons	10.00 to 10.50
Heavy turnings	7.00 to 7.50
Cast borings, net tons	4.00 to 5.00
Car wheels, gross tons	13.50 to 14.50

PHILADELPHIA.

Interest Centers in Wage Reduction—Very Little New Business.

March 31.

Pig Iron.—Owing to the fact that the market continues in a state of almost complete inactivity, interest during the week has largely centered in the wage question, in connection with which there have been some interesting developments. Blast furnace employes in the Lehigh and Schuylkill valleys have very generally been served with notices of a 10 per cent reduction. In the case of one or two interests, this reduction has already taken effect; others will make it effective April 1, and in the case of a few workmen the first Monday in April. Practically all of the larger merchant furnace companies have taken this action, although acting independently, and there is no reason to expect that any labor difficulties will result. No additional stacks have blown out during the week, and it may be some little time before a general movement of this kind sets in, but it seems inevitable in the long run, unless there is speedy improvement in the trade. Despite the limited capacity in operation, stocks have begun to accumulate for the first time this year. So far the accumulation is not heavy in this district, but the

volume of unfilled orders has decreased so sharply and shipments are now being held up to such an extent that stocks are certain to increase rapidly from now on. Current activity is extremely small, total bookings of all interests in this section being only a few thousand tons per week. A small sale of low phosphorus iron has been made at about $21, delivered, a 50-cent concession from the last important transaction. Otherwise quotations continue without change, being as follows for second quarter delivery at eastern Pennsylvania plants:

No. 1X foundry	$16.75 to 17.00
No. 2X foundry	16.25 to 16.50
No. 2 plain	15.75 to 16.00
Standard gray forge	15.00 to 15.50
Basic	15.50 to 16.00
Low phosphorus	21.00
No. 2 Birmingham	15.75 to 16.25
No. 2X Virginia	16.50 to 17.00
No. 2 plain Virginia	16.00 to 16.50

Finished Materials.—The Curtis building contract, involving 14,000 tons of steel, has not yet been awarded. Bids, however, are being tabulated and a decision is expected late in the week, as it is stated that low prices were made and the project will not be readvertised, as was reported. There is likewise nothing definite in regard to the Reading track elevation work, but the inquiry of the Baltimore & Ohio for 10,000 cars is believed to be genuine and business is expected to develop in this connection. Otherwise new business is coming out slowly, though a fair volume of railroad work is current. Having rejected the proposed cut in the wage scale from a $4.50 to a $3.75 base, the puddlers are out at all the mills in this section except two at Pottstown, those of the Glasgow Iron Co. and the Ellis & Lessig Co., where, strangely enough, a heavier cut was accepted than at the Danville, Reading and Conshohocken plants now idle. Going out at this season of the year, the puddlers are likely to find employment on farms, in which case it is difficult to get them back to work. While low prices are being made on fabricated steel there is no evidence that plain material is to be had at under the 1.30c, Pittsburg, base. We quote: Structural shapes, 1.45c to 1.55c; plates, 1.45c to 1.50c, with usual extras; steel bars, 1.35c to 1.40c; refined bar iron, 1.35c to 1.45c.

Old Material.—The situation appears a little stronger, particularly in steel lines, owing to the fact that mills display some willingness to buy. One interest in this section took 2,000 tons of heavy melting steel at $13.50 delivered, during the week, but this was on a forced sale and some scrap sold at $14. It is reported that those interests bought a total of 4,000 tons. Prices of old steel rails are considerably lower, probably reflecting the failure of the Maryland Rail Co., a re-rolling proposition. We quote, gross tons, delivery at eastern Pennsylvania mills, as follows:

Old steel rails (re-rolling)	$14.50 to 15.00
No. 1 steel scrap	13.50 to 14.00
Old steel axles	17.00 to 17.50
Old iron axles	18.50 to 19.50
Old iron rails	16.50 to 17.00
Old car wheels	14.00 to 14.50
Choice scrap R. R. No. 1 wrought	15.00 to 15.50
No. 1 yard scrap	13.00 to 13.50
Machinery scrap	14.00 to 14.50
Low phosphorus scrap	17.00 to 18.00
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire scrap	11.75 to 12.25
No. 2 forge fire scrap, ordinary	7.00 to 8.00
Wrought turnings	9.75 to 10.25
Axle turnings, heavy	11.00 to 11.50
Cast borings	8.00 to 8.50
Stove plates	11.75 to 12.25

NEW YORK.

March Sales of Structurals 100,000 Tons—Some Pig Iron Inquiries.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., March 30.

Pig Iron.—Several fair sized inquiries have developed during the last few days, chiefly for prompt shipment. This, in the face of the hesitating attitude generally prevailing among foundrymen, is indicative of better things as soon as it can be demonstrated to the consumer that bottom prices have been reached. The largest sales recently made, so far as can be learned, were 1,000-ton blocks, several of which have been disposed of by Southern, Virginia and Eastern Pennsylvania producers. These, with sales here and there of 500-ton, 200-ton and smaller lots, have made up an aggregate considerably better than for some weeks past. The level for No. 2 Southern seems to be about $11, Birmingham, with reports of slight concessions on certain makes. Virginia product is selling down close to $13.50, furnace; and Eastern Pennsylvania makers are accepting as low as $15.25, furnace, for No. 2X. Buffalo furnaces have advanced prices 25 cents, but one or two interests in that section are still low. Furnaces are declining to sell beyond July 1 and probably a considerable number will blow out before then. We quote, second quarter delivery at New York tidewater as follows:

Northern foundry No. 1	$16.50 to 17.00
No. 2X foundry	16.00 to 16.50
No. 2 plain	15.50 to 16.00
No. 2 southern foundry	15.00 to 15.50
Malleable	17.00 to 17.50
Basic	15.50 to 16.00
Gray forge	15.00 to 15.50

Ferro-Alloys.—Inquiries are pending, mostly for western shipment, on about 1,000 tons of ferro-manganese, small lots of which are now selling at under $42, seaboard. Ferro-silicon inquiries now in the market total about 200 tons, on which $60, Pittsburg, will probably be shaded. Two or three car lots have been sold recently.

Finished Material.—March bookings of structural materials were in the neighborhood of 100,000 tons, about half of which went to the leading interest. This total, however, does not include 5,000 tons of bridge work on the Louisville & Nashville and 9,000 tons on the Chicago & Northwestern, both taken by the American Bridge Co., reported from Chicago last week. Since the reduction in steel prices about the middle of February, bookings of this interest have aggregated some 60,000 tons, about half of the total business placed, this being the normal percentage. The Modern Structural Steel Co. secured 2,000 tons of the Northwestern order, in addition to that noted above. Bookings of the week were rather few. The American Bridge Co. secured the Tiffany store addition, 700 tons; the Mechanics' Library in San Francisco, 800 tons; the Ball Realty building in New York, 2,000 tons; bridge work for the Norfolk & Western to the extent of 1,100 tons; and some 2,000 tons of bridges for the Carolina, Clinchfield & Ohio. No decision has been announced on the New York Central requirements, 39,000 tons, and the Florida & East coast has postponed action on its 11,000-ton inquiry. The Firemen's Insurance building at Newark, 500 tons, went to the Hay Foundry & Iron Works; the Miami Copper job, 1,500 tons, was taken by the Minneapolis Steel & Machinery Co., and the Kohler-Chase Co. building at San Francisco, 500 tons, was awarded to Milliken Bros. The American Bridge Co. is expected to secure the steel contract for pier shed 53, in this city, 2,000 tons, and for the Kentucky river bridge, 6,500 tons. The Northwestern is to buy 6,000 tons of steel and the Burlington, 2,000 tons. Prices on fabricated material are running very low, but hardly as low as current rumors would indicate.

The Pennsylvania Steel Co. has taken an order, involving about $250,000, for the frogs, switches, curves, etc., required by the Pennsylvania Tunnel & Terminal Co., for its terminals; these are all made with manganese centers. This interest has also booked 4,500 tons of girder rails for the Milwaukee Light & Power Co., and the Lorain Steel Co., 22,000 tons for the Chicago Railways. Export rail

inquiry continues fair. A lot of 5,000 tons for the Havana Central has been placed abroad, and the Grand Trunk has ordered 40,000 tons from the Dominion Iron & Steel Co. Light rails have been cut another $1. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.46c; beams, 3 to 15 inches, 1.46c; tees, 3 x ¼-inch and heavier, 1.51c; plates, carloads, tanks, 1.46c; marine boilers, 1.86c; bar iron, 1.35c to 1.40c; soft steel bars, 1.36c; sheets, No. 28, black, 2.56c.

Cast Iron Pipe.—Aside from the San Francisco contract for 45,000 tons, formally entered during the week, the United States Cast Iron Pipe & Foundry Co. has booked 6,000 tons at Pittsburg, 3,600 tons at Rochester and 500 tons at Chelsea, Mass. R. D. Wood & Co. have secured the Reading contract, 700 tons, and a number of small orders have been placed. Inquiry appears considerably better.

Old Materials.—A determined fight will be made by eastern pig iron interests on the proposed reduction of scrap duty to 50 cents per ton. The local market is quiet and several lines are lower. The inquiry for 1,000 tons of heavy cast scrap, noted in our last issue, has been placed. We quote gross tons, delivered at New York tidewater, as follows:

Old steel rails (re-rolling)	$13.50 to 14.50
Relaying rails	19.00 to 19.50
Old car wheels	12.50 to 13.00
Old iron car axles	15.00 to 15.50
Old steel car axles	12.50 to 13.00
Heavy melting steel	10.75 to 11.25
No. 1 railroad wrought	13.50 to 14.00
Iron track scrap	11.50 to 12.00
Wrought pipe	9.00 to 10.00
Cast borings	5.50 to 6.00
Wrought turnings	7.00 to 7.50
Heavy cast scrap	12.50 to 13.00
Railroad malleable	12.50 to 13.00
Stove plate	9.00 to 9.50
Grate bars	8.50 to 9.00

BUFFALO.

Pig Iron Market Dull—Some Business in Structurals.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, March 30.

Pig Iron.—The pig market continues dull and only small closings are reported. Quotations are approximated only, which condition has prevailed for a long period. It is not believed the market is losing tone, but prices are not expected to drop lower than they are now. The prices given below are not specific, but they represent in a general way the selling this week. We quote, f. o. b. Buffalo, as follows:

No. 1X foundry	$16.25 to 16.75
No. 2X foundry	15.75 to 16.25
No. 2 plain	15.25 to 15.75
No. 3	15.00 to 15.50
Malleable Bessemer	16.50 to 17.00
Gray forge	14.75 to 15.25
Charcoal	20.50 to 21.00

Finished Products.—There is little more activity in finished material than heretofore, and specifications now out will keep up the tone of business for some time, although the amount of tonnage involved is not normal as compared with movements of like periods in previous years. Among the recent closings is the contract awarded by the Fulton Paper Co., of Fulton, N. Y., to the National Construction Co., of Syracuse, N. Y., for 500 tons fabricated structurals; Carborundum Co., of Niagara Falls, N. Y., to Carnegie Steel Co., 275 tons. The Fulton Paper Co. contract represented a total price of about $17,000 delivered. In Rochester this week, a contract will probably be let for 400 tons fabricated in Aqueduct building. There were two low bidders, one a Rochester firm. The Onondago Hotel Co. order, Syracuse, is still pending, although there is reason to believe the order will be placed at once. Bids on the second call were opened at Syracuse yesterday afternoon. Several minor contracts are pending.

ST. LOUIS.

Fair Volume of Business in Prompt Shipment Pig Iron.

March 30.

Pig Iron.—One order was placed in the St. Louis territory last week for 500 tons of southern No. 2 foundry iron at $11.50 Birmingham, for shipment in equal monthly quantities over the second quarter of the year. This was about the only business reported to have been placed with the furnaces for actual shipment during the next few months. A fair volume of business has been placed for prompt shipment at from $11 to $12.25, Birmingham basis, for No. 2. Inquiries are out for an aggregate tonnage of 1,500 tons for both prompt and future shipment. Some of the buyers in the St. Louis territory are looking for lower prices and on that account refrain from purchasing pig iron, while others, believing the market has about reached bottom, are waiting for business to pick up before figuring on their requirements. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$16.25 to 16.75
No. 2 southern	15.75 to 16.25
No. 3 southern	15.25 to 15.75
No. 4 southern	14.75 to 15.25

Coke. The coke market has undergone very little change. It is appreciated generally that prices cannot go lower. For prompt delivery, the best selected low-sulphur Connellsville 72-hour foundry coke is quoted at $2.15 to $2.25, ovens. Prices on the same grade for contract shipment over the remainder of the year run from $2.25 to $2.40, ovens. Some higher sulphur Connellsville coke is offered as low as $1.90 ovens. Connellsville 48-hour furnace coke is quoted at $1.50 to $2, ovens, for all deliveries. Virginia and West Virginia 72-hour foundry is selling at $2.25 for prompt and $2.50 for future delivery. The freight rate to East St. Louis and St. Louis from Connellsville and the Virginia fields is $2.80, and $2.70 from the Virginia fields when shipments are destined beyond St. Louis.

Old Material.—The scrap iron market is very dull, with no signs of immediate improvement. Quotations remain as follows:

Cast iron borings, free from foreign material, net tons	$ 6.00
Steel axle turnings, gross tons	12.00
Steel railroad axles, net tons	17.50 to 18.50
Iron railroad axles, net tons	19.00 to 20.00
Miscellaneous steel scrap, gross tons	12.50 to 13.00
Old car wheels, gross tons	16.00
No. 1 railroad cast scrap, net tons	12.00 to 12.50
Heavy machinery cast, net tons	13.00 to 14.00
Stove plate and light cast, net tons	11.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net tons	13.00 to 13.50
Railroad malleable, net tons	12.00 to 12.50
Heavy melting steel, net tons	13.00 to 13.50
Relaying rails, net tons	17.00 to 18.00

SEATTLE.

Business Quiet—Competition Results In Lowering Some Prices.

Office of THE IRON TRADE REVIEW, 302 Pioneer Bldg., March 26.

Very little business has developed on the Pacific coast during the past two weeks. Low prices are the order of the day, but with the exception of a few special lines there is little interest manifested. There has been an attempt to establish a definite price of $2.25 for iron bars, but the business being booked at this figure presages a reduction of at least 5 cents. The reduction of the tariff on bars will have the effect of further curtailing the consumption of American goods in this market. Business in wire nails is fair, but the price is very low. The current quotation to jobbers is $2.40. This is 40 cents per 100 pounds less than the Pittsburg price plus the freight and is due to severe local competition between independent nail mills and the leading interest. Some fair sales of merchant pipe are reported and official prices are being well maintained. The American Steel & Wire Co. has taken an order for 115,000 square feet of reinforcing fabric for the new Henry building, Seattle. The foundries are melting a good tonnage, but prices are ragged. Tin plate sales remain good and the recent reduction is expected to stimulate specifying.

Pig Iron.—Everyone is waiting for the new railroad rate to take effect and for the tariff to be settled. There is a little buying for immediate re-

quirements, but practically none for future deliveries. The midsummer cargoes from Europe have been well sold out, but at some sacrifice. Brokers are hesitating to offer European iron for fall delivery until the tariff is fixed. But little fault can be found with the foundry melt and as soon as the outside factors are eliminated, pig iron will begin to move again on the Pacific coast. The ship Procyon arrived on Puget Sound this week with 1,000 tons of Cleveland No. 1. We quote gross tons as follows, ex ship Seattle in the case of foreign iron; southern iron f. o. b. Seattle:

English, Cleveland No. 1, spot	$26.00 to 26.50
English soft No. 1, to arrive May-June	24.00 to 25.00
English soft No. 1, to arrive July-August	22.00 to 24.00
Southern soft, No. 2	23.00 to 24.00

Coke.—The movement is fair and prices are being well maintained. About 1,000 tons of German syndicate coke is due on Puget Sound in May and June. We quote $6.50 to $8 per net ton for local foundry coke and $10.50 per gross ton for German coke, ex ship Seattle.

Old Material.—Very good weather is bringing in quantities of country scrap, but the market continues unyielding. Spokane prices are now almost the same as Seattle. We quote in net tons, f. o. b. Seattle:

Foundry and machinery scrap	$18.00 to 19.50
Old steel rails	8.00 to 9.50
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.50 to 8.00

Merchant Iron.—A few scattering sales are stirring the market to a slight activity. Prices, all things considered, are being well maintained. Steel bars are more active than iron. We quote base prices per 100 pounds, f. o. b. Seattle: Common iron bars, $2.25; mild steel bars, $2.35; machinery steel, $2.70; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.75.

BIRMINGHAM, ALA.

Pig Iron Market Very Dull—Iron Shipped From Ensley.

March 29.

The southern pig iron market continues dull and very little of the product is being sold. Some speculative purchasing is offered, but so far the manufacturers are not inclined to meet the prices at which the buyers desire to take over the product. One interest offered to take at a jump 10,000 tons and it is reported that he wanted the metal at $10 per ton. While the market is in a somewhat demoralized condition so far as the quotations go, there has been no iron sold in this district that has been heard of under $11 per ton, No. 2 foundry, and very little is now being sold at that price. Some of the furnace companies are still adhering to $12 per ton, No. 2 foundry. The matter of price does not appear to induce business. There is a belief that some buying for speculation might start in within the next few days, the $11 or a little less to be the low price for the same. If this buying starts, it may have the tendency of reviving matters. Some of the iron companies in the southern territory have orders on hand taken in before the turn of the year that will call for iron for some weeks yet. The shipment of pig iron from the Ensley furnaces was a feature of the past week. Heretofore all of this product was used in the steel plant.

BRITISH MARKETS.

Pig Iron Depressed—Severe Competition in Finished Lines.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 20.

The pig iron market has once more been extremely depressed and further reductions are common. In the Cleveland district, the lowest point for four years was touched on Tuesday with selling prices for No. 3 at 45s 11½d ($11.25). There has been a slight recovery since, business being done yesterday on a basis of 46s 3½d ($11.33). The gloomy outlook is discouraging future buying, so that scarcely anybody buys for other than immediate requirements. Stocks continue to increase, the total now in store being 189,141 tons. The increase this month is 14,926. The exports are discouraged somewhat by bad weather, which has closed some of the ports on the other side of the North Sea. The only slight animation in exports is in Italian shipments, which have shown a little improvement. The hematite trade is dull in spite of slightly better demand for finished steel. Mixed numbers on the east coast are selling at 55s ($13.46). In the Midland district, where depressing influences have been more successfully resisted, prices are now giving way, having fallen from 6d to 1s on the week in Staffordshire, Northampton and Derbyshire. The peculiarity in this case is that there are no Midland stocks, the whole of the iron going into consumption. The dullness is partly due to the entire absence of any orders worth mentioning for cast iron pipe. Founders are hoping that the improvement in this branch reported from America may extend to this country.

Finished Material.—The finished trade continues very dull, the only encouraging circumstance this week being the determination of the galvanizers' association to maintain prices at £12-10. Their firmness is a matter of astonishment to makers in all other branches, where prices are generally demoralized, owing to severe competition, and an absence of combination. In the tube trade, very severe competition is being met with from Germany and America, but it is remarkable that the great firm of Stewarts & Lloyds, of Glasgow and Birmingham, report a profit of £161,155, and have £233,963 for distribution, out of which they propose to pay 11 per cent on ordinary shares making 10 per cent for the year. This profit is an increase on the previous year, a very rare occurrence in the present bad time.

A serious strike is threatened in the Birmingham district owing to the refusal of the engineers to accept a reduction of 1 shilling per week. Long conferences have taken place at which the parties have been unable to agree.

METAL MARKET

NEW YORK.

March 30.

Copper.—A better demand, both for foreign and domestic account, has given the market some measure of firmness during the week. A considerable amount of buying has been done by manufacturers in this country, chiefly in electrolytic, and the situation is stronger abroad. We quote: Lake, 12⅞c to 13⅛c; electrolytic, 12½c to 12⅝c; castings, 12⅜c to 12½c.

Pig Tin.—After several days of very limited trading, the market early in the week developed considerable strength and brisk buying developed both in this country and abroad. The current quotation is 29c to 29¼c.

Pig Lead.—Sheet and pipe manufacturers are in the market for fair amounts of this metal and business is reported as considerably improved. Prices have advanced to 4.05c to 4.10c, New York.

Spelter.—There is no change in the situation and trading continues extremely light on the level of 4.75c to 4.77½c, New York.

Antimony.—Cookson's, 8c to 8⅛c; Hallett's, 7⅞c to 8c; ordinary brands, 7⅜c to 7⅝c.

ST. LOUIS.

March 30.

Lead and Zinc.—Ore buyers evinced a strong demand for high grade zinc in the Joplin district last week. The base price ranged from $36 to $38 a ton for 60 per cent ore, with a high price of $40 a ton. The surplus stocks of low grade ore laid in during the previous weeks by many of the smelters did not figure conspicuously in the buying last week. There was no difficulty experienced in securing all the ore needed at $37 or less, and the $38 base was paid only in a few instances. The high price of $40 was paid for some Joplin ore on a base of $37.50.

Lead was stronger and jumped up to $38 a ton, the highest point in several months, resulting in a heavy sale of this ore. The total shipment for the district was slightly less than the average. Silicate sold for $17 base of 40 per cent ore, with a high price of $21. St. Louis pig lead was quoted Saturday at $3.85, and spelter was steady at $4.65.

WAGE REDUCTIONS

Announced by Republic Iron & Steel Co. and Eastern Manufacturers.

Announcements of wage reductions throughout the east and the middle west most of which become effective this week have become general in the past week. Employes of rolling mills, blast furnaces and steel plants are affected by the readjustment, although in some cases day laborers earning no more than $1.25 to $1.30 per day are especially exempted from the cut. In others office employes and in fact all salaried men came under the reduced schedule.

The Lackawanna Steel Co. was the first large concern to announce a reduction, it approximating 10 per cent. The Republic Iron & Steel Co. has announced a wage readjustment affecting every employe in its Bessemer plant, blast furnaces both north and south and its rolling mills, except in the case of men governed by the wage agreement with the Amalgamated Association of Iron, Steel & Tin Workers. The cut amounts to 10 per cent and is effective April 1. The Carpenter Steel Co., Reading, Pa., provides for a reduction ranging from 5 per cent to 10 per cent. Lehigh valley blast furnace operators have decided upon a 10 per cent reduction which will place the wages upon the same basis as that of 1905. The Wharton Steel Co., Wharton, N. J., solely excepts the day laborers from the 10 per cent reduction of its blast furnace employes, effective April 1. The Bethlehem Steel Co.'s reduction of 10 per cent, effective April 1, reaches all its blast furnace employes.

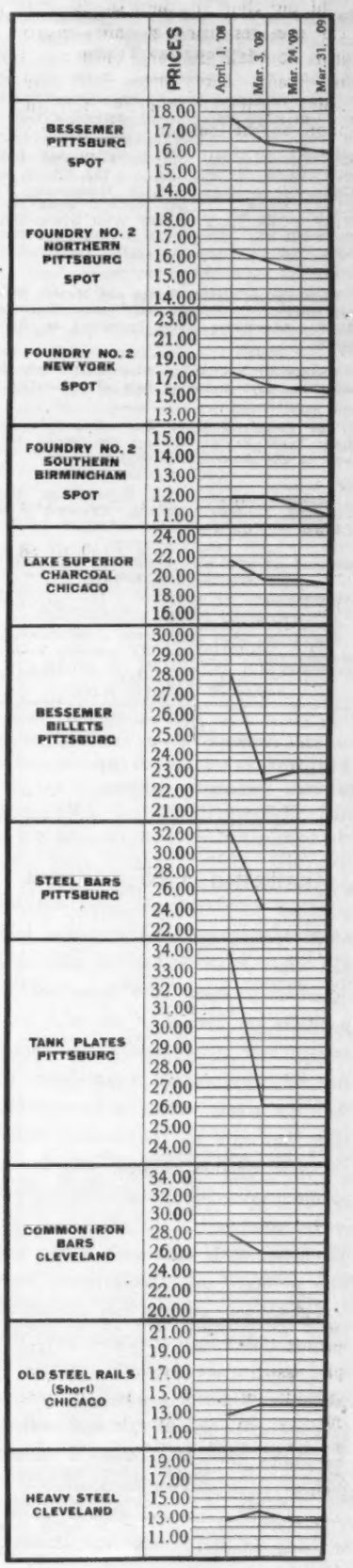
The American Iron & Steel Mfg. Co., Lebanon, Pa., has announced a reduction in puddler's wages from $4.50 to $3.75 a ton, the reduction to take effect April 5, and the Reading Iron Co. a like reduction to take effect March 29. Other eastern Pennsylvania rolling mill owners including the E. & G. Brooke Iron Co. of Birdsboro, J. Wood & Bros. Co., the Allan Wood Iron & Steel Co., and the Longmead Iron Co., of Conshohocken, Pa., have cut the puddling rate to $3.50. In the case of the Reading Iron Co. the district convention of the Amalgamated association at Reading recommended a refusal on the part of the puddlers to accept the reduction and negotiations are still pending. In the case of the Conshohocken puddlers, the latter offered a compromise reduction of 50 cents a ton which the manufacturers have refused, instead closing down the mills. It is reported that the puddlers employed by the George B. Lessig Co., Inc., Pottstown, Pa., have accepted a reduction to $3 a ton and have gone to work.

The reduction made by the Shenango Furnace Co. makes the revised scale of blast furnace labor as follows: Keepers $2.50, helpers $2, fillers $2, tenders $2.10, and laborers $1.60. The former scale had been generally paid by blast furnace interests in the Pittsburg and valley territory for several years past and other plants which plan to continue in operation are expected to shortly follow the step of the Shenango company. The latter now has two furnaces in blast and is expecting to start another in a few weeks.

At the present time the attitude of a number of the independent steel works and blast furnaces is subject to whatever action may be taken by the United States Steel Corporation as to its plants. It has been the custom of the Carnegie Steel Co. to give 90 days' notice if any change in wages was likely to be made and to ask that the men do likewise in the event they were contemplating asking for increases. Such a notice was given the men by the Carnegie Steel Co., Jan. 1, 1909, so that any reduction that may be announced to apply after April 1 will be in keeping with past good faith.

Puddlers employed at the Central Iron & Steel Works, Harrisburg, Pa., who were offered $3.50 a ton, a reduction of 50 cents, have refused to accept the reduction and the company has closed down its plant.

PRICE CHART.



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SEEKING THE BOTTOM.

In the past fortnight there has been much consulting of the statistical tables and other research for the purpose of ascertaining what have been the low points in the history of the steel industry. There is evidently the thought that, if there is not a possibility that such low points will again be reached, it is at any rate fair to consider current prices in relation to them with the idea of discovering the probabilities of further recessions.

It is naturally interesting at this juncture to make these comparisons, but it is questionable whether they are not misleading rather than otherwise, since those who must make a search to ascertain what were the low prices are fairly certain not to be posted as to the attendant conditions and are likely to mislead themselves in making deductions.

It is not remarkable that a word of warning in this connection should be considered timely at this juncture. In 1903 pig iron prices dropped steadily, billet prices rather spasmodically, and several finished steel products suffered sharp individual cuts. There was the same tendency, in some quarters, to look for the old low points. In THE IRON TRADE REVIEW of Sept. 24, 1903, an editorial appeared headed "Old Low Points Not to be Expected," the stand being taken that conditions had so changed, since the old low points were made, that it would be entirely impossible, in any measureable time, to reach them again. Wages had advanced all along the line, while definite values had been placed upon minerals in the ground, and these values could not lightly be wiped out. The observation was made that prognosticators as a rule were divided into two classes, one class assuming that conditions once established, even if for but a short period, could not thereafter change, and the other class assuming that everything moved as a pendulum, and if certain conditions were found at one end of the swing, they would be found again at the end of the next swing, whereas the middle course between these two schools of thought would more likely be found to be the correct one. The event proved the correctness of the observation. At the time it was made, Bessemer pig iron was about $16, valley furnace, having declined from $21 at the beginning of the year. The historic low point had been $8.75. The low point, made in June of the following year, was $11.50, which price was only 87½ cents below the half-way point between $16 and $8.75. Steel billets showed exactly the same movement. The market in September, 1903, was $27, the historic low point having been $13.50. The half-way point between these was $20.25, and the succeeding low point on billets proved to be 75 cents below this half-way point, $19.50, made in October of the following year.

At this juncture, it is well likewise to observe that the iron and steel trade is in no position to find its old low points overnight. In 1903 there had been five years of progressive advancement in wages, supplies and the general cost of production and transacting business. At this time there have been practically 10 years, with almost nothing done in the way of liquidation. It is true that in 1897 or 1898 the historic low points were made on nearly all iron and steel products, but they were made after four or five years of intense depression and liquidation. It was not lack of demand which brought out those low prices, because demand was much heavier than it had been. The 1897 pig iron production exceeded by more than 40 per cent, and the 1898 production by more than 75 per cent, the production in 1894, yet it was by no means in 1894 that the lowest prices were made. Even though there was the disadvantage of coke being 50 to 75 cents higher in 1897-8 than in 1894, pig iron and billets were $1 to $2 a ton lower, and practically all finished steel products were decidedly lower than in 1894. Had it been possible, the lowest prices would have been made in 1894, because it was then that the needs of producers were greatest, but it was not possible. It required years of liquidation to bring out the lowest the trade could do.

Thus it would only be by a process of liquidation, if at all, that the old low prices could be attained. Assuming for the sake of the argument that it could be done, it must be noted first that it required four or five years of depression to bring out those historic low points in the nineties and second that, if it is a matter of liquidation, there is at this time a great deal more to liquidate. Prices of pig iron and of crude steel in the past few years have been very much higher than the prices in 1892, the year before the 1893 panic. An all-around average would place the difference at from $5 to $8 a ton in pig iron and billets, leaving so much more to liquidate, in case the old low points could be found at all by liquidation.

A large part of the cost of producing finished steel is made up of railroad freights, as several tons of raw materials must be assembled to produce one ton of finished steel, and there are freights on fuel and supplies for intermediate operations. These freights have suffered large advances in the past 10 years, and they will not easily come down. Indeed, the most recently shown

tendency of the railroads has been to advance them still further. Then another and very large part of the cost of producing finished steel is labor. In some individual operations the labor cost is small, and there has been much comment on the smallness of the direct labor costs at certain points, as in converting an ingot into a rail, or a billet into a merchant bar, but that is not the point, because the other costs are traceable chiefly to labor, and even the freight rates, already considered, are traceable largely to labor.

It will be a long time before any very great reduction is made in labor costs. Even liberal reductions from the recent scale would still leave rates quite high as compared with rates when the historic low points in steel prices were made. Reductions to those rates would be impossible, in any event, because the cost of living is much higher.

It is a question on which the authorities differ, whether the advances in prices of labor and commodities are due to the increased supply of gold. By some it is urged that the values of labor and commodities have not greatly changed, and that the real change is the depreciation of the dollar. Statistics can be manipulated to show that such is the case, and they have also been used to show that there has been no depreciation whatever in the dollar; that the increase in the gold supply is only what was needed for the enlarged business. In this, as in many other matters, the true view is probably the middle one. There have been improvements in methods of exchange and finance, whereby a dollar in gold, or its representative in other form of money, does a great deal more work than formerly, so that even if gold is really not more plentiful, the circulation of money or credit is greater, and by whatever such is the case the old low points in prices cannot be expected to be reached, while there are to be considered in addition the greater cost of living with the impossibility of reaching old wage standards, and the actual value which events have placed upon minerals in the ground.

The opinion has recently been expressed by some recognized authorities in the steel trade that the reduced prices on certain steel products recently made are, all things considered, really the lowest in the history of the industry. While there may be some ground for disputing this view, it is obvious that they are much lower, referred to existing conditions, than a comparison with the statistical low points would suggest.

Although many state legislatures as well as congress are now in session, it is gratifying to note that, especially in the states east of the Mississippi, there is a general disposition to be conservative concerning legislation relating to the railroads. It is reported that some objectionable bills have been passed west of the Mississippi, but certain it is that, taking the country as a whole, bills of this kind are not so numerous or so radical, and the disposition to consider measures of railroad restriction with caution is generally manifested. This change of attitude is undoubtedly due partly to the results of observation by legislators of the evil effects of pernicious regulation, but the work of the Railway Business Association and the action of some 50 organizations of business men in opposing unjust railroad regulation have been a most important factor in bringing about more satisfactory conditions. It is to be hoped that we have seen the last of legislation which did so much toward wrecking the great railroad interests of the country.

THE DUTY ON SCRAP.

Editor of THE IRON TRADE REVIEW:

Since I have been asked a number of times the past week to give expression to my views on the probable ultimate effect of the tariff reduction on scrap as outlined in the Payne bill, I take pleasure in submitting them through the medium of your valued journal in order that I may thus avoid the necessity of constant repetition.

To illustrate my opinion, let us take the country nearest our own and from which we are most likely to import scrap, Canada, as an instance. It is natural to assume that only the surplus scrap will be offered for sale to buyers in the United States at prices prevailing here. Therefore, instead of consumers in the United States receiving the benefit of low-priced Canadian scrap, the Canadian consumer will be compelled to pay the price prevailing in this country, less the slight tariff and freight charges. Consequently, instead of manufacturers in the United States being able to buy cheaper scrap, Canadian manufacturers will be handicapped by the certain increased cost to them of their raw material, and they will not have the margin of profit to their credit which has prevailed heretofore.

If this be true respecting Canadian scrap, it is equally true of European scrap. And if this be true of scrap, the same principle will apply to pig iron, billets, etc. In other words, instead of the prices of these materials being actually lowered in the United States, through the principle I have endeavored to illustrate above, the prices of these materials in foreign countries will be automatically raised; and consequently, the conditions I have endeavored to outline will not only protect the American manufacturer, and therefore the producer of scrap, but really will give him a better foreign price and more available foreign market. In a nutshell, my argument is that only the surplus scrap, pig iron, etc., will be marketed in this country, since it is obvious that consumers abroad must continue to purchase their regular requirements, no matter what the price. Thus the market will be advanced on its regular requirements abroad to the point that shippers are able to obtain for their surplus, and this surplus scrap available for shipment to this country will not be sufficient in quantity to depress the market materially here. Consequently the cost of raw and semi-finished material will advance in proportion abroad to the existing price of similar material in the United States, less the freight, etc.

This theory may seem not only unusual, but startling as well. Yet only through actual experience to be gained through observation of actual future transactions, and not mere speculative talk, can change my firm belief in the truth of what I have endeavored here to set forth. A. F. BAUMGARTEN.

Pittsburg, March 20.

CHARLES T. PORTER AWARDED JOHN FRITZ MEDAL.

For his work in advancing the knowledge of steam engineering and in improving engine construction, Charles T. Porter, honorary member of the American Society of Mechanical Engineers, has been awarded the John Fritz medal for 1909. This will be publicly presented at a meeting in the Engineering Society's building, New York city, Tuesday evening, April 13. In connection with the presentation ceremonies, addresses will be delivered by the following: W. F. M. Goss, dean of the engineering college at the University of Illinois, on "The Debt of Modern Industrial Civilization to the Steam Engine as a Source of Power;" Prof. F. R. Hutton, Columbia University, on "The Debt of the Modern Steam Engine to Charles T. Porter;" Robert W. Hunt, Chicago, on "The Debt of the Era of Steel to the High-Speed Engine;" and Frank J. Sprague, New York, on "The Debt of the Era of Electricity to the High-Speed Steam Engine."

At a recent meeting of the creditors of the Birmingham Coal & Iron Co., now in the hands of receivers, A. W. Smith, W. P. G. Harding, and James Bonnyman were elected trustees and bond fixed at $25,000 each. The referee has issued an order continuing the company's works in operation.

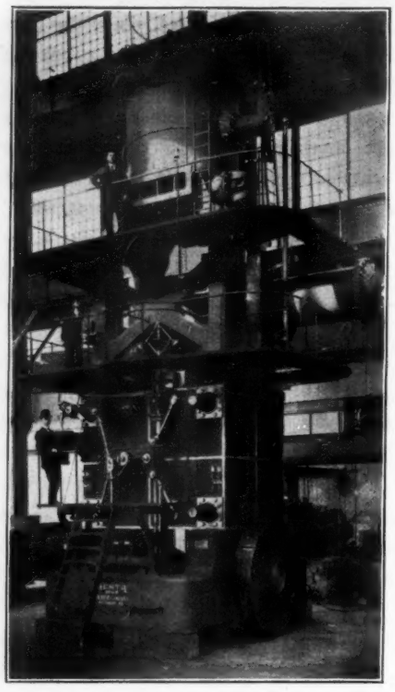
MESTA MACHINE

Shops Were Inspected by Large Party of Engineers.

Having just completed, in the record-breaking time of 30 days, the construction of a 36 x 72 inch Corliss engine of the heavy duty type, the Mesta Machine Co., Pittsburg, signalized this achievement by throwing open its extensive plant at West Homestead, Pa., Saturday afternoon, March 27, for the inspection by interested engineers and manufacturers of this work and of the general operations of the company. More than 500 visitors representing the Engineers' Society of Western Pennsylvania and other technical organizations of Pittsburg accepted the company's invitation and spent the afternoon inspecting the machine shops, foundries and other departments of the works. The trip to and from West Homestead was made by special train.

Much of the interest of the crowd centered in the new engine which was set up on the erecting floors ready for shipment to the Phillips Sheet & Tin Plate Co., Clarksburg, W. Va. An accident at the plant of the latter company, Feb. 24, wrecked its main power engine and caused an emergency order to be placed with the Mesta company. The construction work was pushed with all speed and within 30 days from the receipt of the order, considerably less than the specified time, the new engine was ready for installation. The flywheel weighs 100 tons.

On the erecting floors were also displayed, a low-pressure blowing engine of the long crosshead type with steam cylinder diameter of 84 inches, air cylinder diameter of 84 inches and



MESTA BLOWING ENGINE.

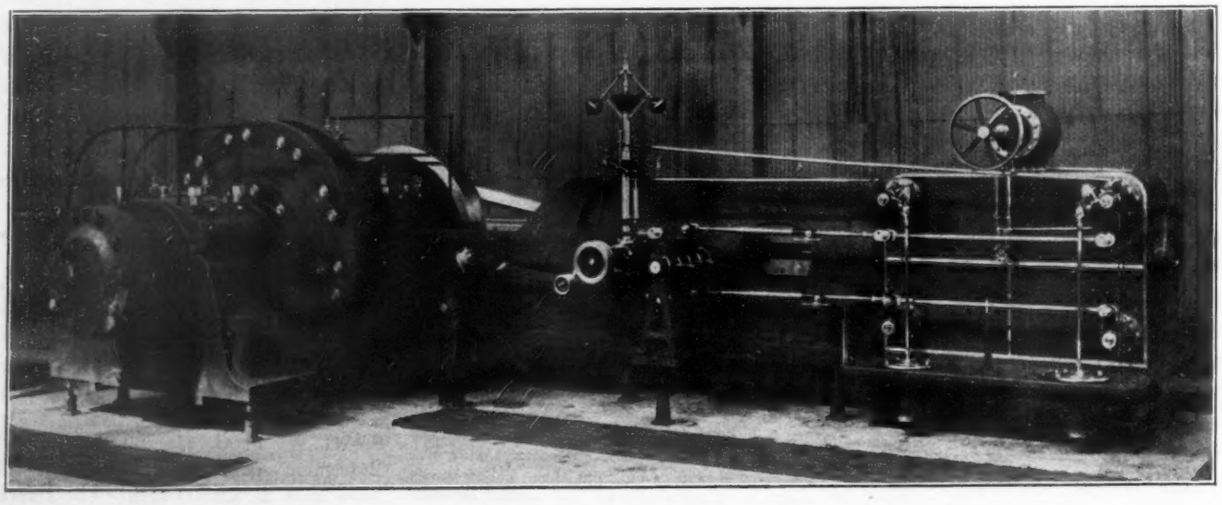
60-inch stroke for the Tennessee Coal, Iron & Railroad Co. at Ensley, Ala., and the machinery for a 600-ton metal mixer which is also to go to the works of the latter company. The mixer is to be the largest ever used in a steel works.

In the roll foundry, the visitors were shown the casting of water-chilled rolls. In the steel foundry a 60,000-pound heat was poured. The casting of a 160,000-pound engine bed plate in the iron foundry was watched with special interest by the inspecting party. The pouring was done simultaneously from four large ladles and the operation was conducted with accuracy and desirable speed.

Most hospitable treatment was provided for the crowd on every hand. At the conclusion of the tour of the works, luncheon was served in the basement of the new pattern shop. The entertainment of the visitors was in charge of the officers of the Mesta company, President George Mesta, Vice President Charles J. Mesta, Secretary W. D. Rowan and Treasurer J. O. Horning.

N. M. T. A. Speakers.—The National Metal Trades Association has secured the following speakers for its convention banquet, which will be held at the Hotel Astor, on the evening of April 14: Hon. Leslie M. Shaw, ex-secretary of the United States treasury; Hon. Seth Low, ex-mayor of New York City; Hon. Rodolph Lemieux, minister of labor and postmaster general of the Dominion of Canada, and the father of the well known "Lemieux Act". The Hon. Patrick F. McGowan, president of the Board of Aldermen, New York City, has promised to open the convention on the morning of April 14.

Indicted for Conspiracy.—Charging conspiracy to defraud the city under the old "Boston Agreement" the grand jury at that city has returned indictments against a large number of structural steel representatives, several of whom have pleaded not guilty and been released on bond. The list of supposed members of this agreement includes 34 names, among them several men now dead.



MESTA ENGINE FOR PHILLIPS SHEET & TIN PLATE CO., BUILT IN THIRTY DAYS.

TRAFFIC CLUB

Holds a Brilliant Banquet—Congress is Defended.

Trade and transportation were the keynotes of the annual banquet of the Traffic Club of Pittsburg held at the Fort Pitt hotel in that city Friday evening, March 26, and attended by men prominent in the industrial and railroad life of Pittsburg and of the country at large. The assemblage was a brilliant one, the guest list numbering more than 500. At one end of the table the Union station of Pittsburg was represented in miniature and at the other was a tiny blast furnace, while small trains loaded with ore stood between, typifying the business interests of the banqueters. The speakers of the evening were W. W. Finley, president of the Southern Railway Co., Senator J. A. Hemenway of Indiana, Attorney J. E. Hedges of New York and Dr. Geo. E. Vincent of the University of Chicago. President S. L. Seymour of the Traffic club made the address of welcome introducing as toastmaster Chas. S. Belsterling, traffic manager of the American Bridge Co. At the speakers' table were seated many prominent iron and steel men, including E. W. Pargny, president of the American Sheet & Tin Plate Co., A. C. Dinkey, president of the Carnegie Steel Co., Willis L. King, vice president of the Jones & Laughlin Steel Co., Taylor Alderdice, vice president of the National Tube Co., Isaac M. Scott, president of La Belle Iron Works, T. W. Guthrie, president of Republic Iron & Steel Co., and others.

Senator Hemenway in his address defended congress against criticisms that had been made of that body in recent years. He declared there had been too much criticism not only of congress but of the railroads and industrial concerns as well, and laid much of the blame for this at the door of magazines and newspapers, which had had a great effect in the molding of public opinion of the past several years. Senator Hemenway believed that the general lack of confidence and the prevailing business depression had resulted from the crusade that had been waged against congress and the industrial concerns. He said:

I sincerely believe that President Taft will give the country a business-like administration, which means that the laws will be strictly enforced, but that the cases will be tried in the courts and not in the headlines of the newspapers; that the constitution will be followed and that the courts will be complimented and not criticised for determining the cases according to law. Real reforms are matters of growth, not of revolution. But beware of the demagogue, who under the guise of a reformer and public benefactor undertakes to change the world in a day, but whose real purpose is to advertise himself and try to float into great prominence on a wave of unsubstantial popularity. The former has his country's interests at heart, the latter his own.

LARGE PIPE CONTRACT

Awarded by San Francisco to the United States Cast Iron Pipe & Foundry Co.

San Francisco, March 24.—The contract for furnishing the pipe to be used in construction of the auxiliary fire system was awarded to the United States Cast Iron Pipe & Foundry Co., after an assurance had been received by the board of public works that the cost of transportation would not exceed $11 a ton. The board of works received letters today from the Southern Pacific and the Santa Fe roads, offering an $11 rate, $2 less than the ordinary rate, to pay carrying from the foundry in Alabama to San Francisco. The company also agree to switch the cars free of charge on arrival to the storage lot. Storage on the railroad grounds or storage yards is also to be free. At that rate pipe can be laid down in San Francisco as cheap as it could by water. The average cost, exclusive of freight, will be $20.54 a ton. The company's bid for the 44,566 tons amounted to about $1,475,000.

The town trustees of Sausalito have expressed a preference for home industry in awarding contracts for the new water system of that town. Bids for supplies and material were opened two days ago. Delegations from local fabricators, the iron trade council of this city, and agents of eastern manufacturers pleaded their respective sides. After hearing the arguments the trustees expressed a preference for the home-made article, giving reasons for so doing. The eastern agents objected, but it seems now that the local men will win out in the end.

South Sharon at Work.—The South Sharon works of the Carnegie Steel Co. at Sharon, Pa., resumed operations at part capacity this week and is rolling sheet bars. The resumption of this plant was scheduled for several weeks ago but an accident to the blooming mill engine caused a delay. Two blast furnaces and a part of the 12 open-hearth furnaces are running.

The annual meeting of the Bethlehem Steel Corporation will be held in Newark, N. J., April 6.

SALE OF BONDS

By Jones & Laughlin Means Completion of Improvements.

The Jones & Laughlin Steel Co., Pittsburg, has announced the sale of $15,000,000 of 5 per cent bonds to the First Trust & Savings Co., of Chicago, and to Blair & Co., of New York. The issue has been authorized, according to the officials of the company, to carry out improvements that had already been planned or are under way and no additional extensions are expected to be financed by it.

The improvements which the company has been lately advancing include four Talbot basic open-hearth furnaces with a capacity of 250 tons each, at its South side works, Pittsburg, and new steel works, finishing mills, and blast furnaces at Aliquippa, Pa. Work on the latter improvement has been going ahead leisurely and three of the blast furnaces are partially completed, although little has been done on the steel works and mills. It is expected that the bond issue will enable this construction to progress more rapidly, although it is stated that the inaugurating of more active operations is dependent upon the improvement in the iron and steel market. The company has issued the following statement upon the issue:

Owing to the existing business depression money has accumulated in the banks and it seemed a propitious time to make the issue. We do not anticipate any large expenditures for new work at the present time, but wish to be ready when times improve to complete plans which we have decided upon.

Will Build New Stack.—The Detroit Iron & Steel Co., Detroit, a subsidiary of M. A. Hanna & Co., Cleveland, has decided to add a second stack to its plant on Zug Island, near Detroit. The present stack, which is 78 x 17½ feet, was put in operation Feb. 15, 1904, and its annual capacity is about 100,000 tons of foundry and malleable pig iron. The second stack will be practically a duplicate of the first. The engineering contract has been awarded to Arthur G. McKee, Rockefeller building, Cleveland. It is expected that the erection of the stack will be started early in the coming summer.

The S. Obermayer Co., Cincinnati, has issued the third of its series of historical post cards. It represents the making of the first castings on record, when the pillars for Solomon's temple were cast.

FOUR STEAMSHIPS

Launched Last Week from Yards on the Great Lakes.

Four launchings of steamships on the great lakes took place last week, three from the yards of the American Ship Building Co., and one from the yards of the Great Lakes Engineering Co.

The steamship LaBelle, which is being built by the American Ship Building Co. for the LaBelle Iron Works, and which will be managed by M. A. Hanna & Co., was launched from the Lorain yards of the American Ship Building Co., Saturday, Miss Wright, daughter of former President Wright, of the LaBelle Iron Works, being sponsor. The ship is 524 feet overall, 504 feet keel, 54 feet beam and 30 feet deep. She is designed to carry 9,000 tons of ore.

On the same day, the Andrew S. Upson, built for R. P. Ranney, of Cleveland, and named for the president of the Upson Nut Co., Cleveland, was launched at the Cleveland yards of the American Ship Building Co. The sponsor for the Upson was Mrs. F. H. Rose, wife of the asistant treasurer of the Upson Nut Co. The steamship is 400 feet over all, 380 feet keel, 52 feet beam and 28 feet deep. It is estimated that she will carry 7,000 tons of iron ore.

The package freighter, North Sea, which was built by the Great Lakes Engineering Co., for the Mutual Transit Co., of Buffalo, was launched the same day at the Ecorse, Mich., yards. Miss Laura Evans, daughter of the auditor, W. R. Evans, of the Transit company, christened the boat. The North Sea is 372 feet overall, 350 feet keel, 46 feet beam and 36 feet deep.

On Wednesday, March 24, the Alpena was launched from the Wyandotte, Mich., yards of the American Ship Building Co., Miss Stephanie Moran, of Detroit, being sponsor. The ship is built for the Michigan Alkali Co., and will carry stone between Alpena and Wyandotte. She is 374 feet overall, 354 feet keel, 47 feet beam and 26 feet deep.

PERSONALS.

At the annual meeting of the Pullman Co., John S. Runnels was chosen director to succeed O. S. A. Sprague.

William P. Grander has been made superintendent of the plant of the Yeager-Hunter Stove Co., Spring City, Pa.

Frederick G. Grumme, secretary and manager of the Decatur, Ind., plant of the Portland Foundry & Machine Co., Portland, Ind., has removed to Robinson, Ill., to take charge of a similar plant owned by the same company. As secretary and treasurer at Decatur he will be succeeded by Charles E. Artman.

W. R. Woodward has tendered his resignation as vice president of the Pittsburg Coal Co., with offices in Pittsburg.

George Thompson has resigned as general superintendent of the Kankakee Foundry Co. to take charge of a foundry at Marion, Ind., for the Gartland company.

George L. Shook has resigned as superintendent of the Haselton furnaces of the Republic Iron & Steel Co. He has been with the Republic company for a number of years.

Thomas Aurelius Jr., who has been with the Colorado Fuel & Iron Co. at Pueblo, Col., and El Paso, Tex., has been transferred to Los Angeles as manager of the division sales agency.

C. H. Jenkins, secretary of the Domhoff & Joyce Co., will assume charge of the Chicago office of that company, effective at once. Mr. Jenkins has been for many years with the Cincinnati office.

Robert J. Gardner has been made general superintendent of the foundry of the S. Jarvis Adams Co., at Midland, Pa. Mr. Gardner had previously been connected with the company in the capacity of salesman.

Charles Peters, who was formerly superintendent of the Union Iron & Steel Co., Ironton, has resigned as superintendent of the Ironton Iron Co.'s new blast furnace at Ironton, O. Walter Marting, secretary and treasurer of the company, will be in charge of the furnace for a time at least.

Stephen Bull, the sole survivor of the four men who founded the J. I. Case Threshing Machine Co., on March 15 celebrated the eighty-seventh anniversary of his birth. The Case company was organized in 1863 by Jerome I. Case, Stephen Bull, M. B. Erskine, and Robert H. Baker.

OBITUARY.

William S. Taylor, president of the Fentress Coal & Coke Co. of Philadelphia, died at his home in that city March 12. He was 61 years of age and a native of Ohio.

T. W. Wismee, for 29 years a leading business man of Caro, Mich., died March 20. He was interested in the company which operates the foundry and machine shop at Caro.

John Bean, inventor of probably the first double action force pump placed on the market, died at Los Angeles, March 19, aged 88 years. He had resided in California 25 years.

George P. Neeley, of Pittsburg, died March 25, in Chicago, on his way home from Los Angeles. He had been connected for 15 years with the firm of Lindsey & McCutcheon. More recently he had been assistant superintendent of a steel and iron company at Sharon, Pa.

Matthew Morton, president of the Morton Mfg. Co., Muskegon Heights, Mich., died March 10 at his home in that city, from an attack of pneumonia, aged 73 years. Born in Scotland, he came with his parents to America in 1844, and settled on a farm in Michigan. He invented a foot lathe, and started in business the year after attaining his majority at Lapeer, Mich., under the name of the Lapeer Steam Engine Works. He constructed his first steam engine in 1861, and in 1891 he removed to Muskegon Heights, where in the same year the Morton Mfg. Co. was incorporated. He was an inventor and a machine builder of note.

SALES OF STEEL RAILS.

(Special Telegram.)

New York, March 31.—The leading interest reports rail sales as follows: Katalla Co., Alaska, 2,500 tons; Wabash, 2,500 tons; Texas Pacific, 3,000 tons; Norfolk & Western, 3,000; Nashville, Chattanooga & St. Louis, 8,400; scattering, 800. The Great Northern has bought 12,000 tons. There is good export inquiry, but few sales are being made.

The United States court of appeals, second circuit, held that steel cylinders containing gas were dutiable at 35 per cent under paragraph 152 of the tariff as "steel tubes." The government contended that its assessment at 45 per cent under paragraph 193 for articles of metal not specially provided for was proper.

A banquet and business meeting of the Milwaukee foundry foremen will be held at the St. Charles hotel on April 6. Speeches will be given by out-of-town men and the annual election of the association will be held.

The Pennsylvania Steel Co. and the Maryland Steel Co. have announced wage reductions of 10 per cent, effective April 1.

The Stoddard Mfg. Co., Dayton, O., has filed notice of a decrease of its capital stock from $500,000 to $50,000.

AMONG MACHINERY MAKERS.

NEW YORK.

Competition Results in Some Concessions Being Made.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., March 30.

The volume of business closed during the month just ending will doubtless show a considerable increase over that of February, as several houses have booked some attractive orders, though activities are still far below normal and the outlook holds out little that is encouraging. Inquiry in certain lines continues extremely brisk, but very little is reaching the closing stage, this being particularly true in the case of industrial cars, power plant equipment and a few other lines. The bulk of the business placed lately has been at moderate concessions, as the competition for going business has become so keen that dealers in a good many instances have been willing to divide commissions with the purchaser, the result being some unusually attractive prices. There has been no cutting by manufacturers, however, other than that previously reported in the heavy lines, such as hammers, punching and shearing machinery, etc.

There is reason to believe that the spring months will see a quite general readjustment of labor charges in machine tool manufacture, although this branch of manufacture has thus far developed nothing on the wage problem. In spite of the fact that the leading bolt and nut interests went through a general and very acute price adjustment some six months ago, another small reduction has been made, following recent meetings in this city and Pittsburg. This averages 5 per cent on bolts and about $2 a ton on nuts, amply sufficient to take up the recent cuts in steel. This new price is being well maintained, but business is extremely light and there is nothing in prospect.

George H. Swift, formerly president of the Machinery Sales Co., Cincinnati, and for the past three months associated with the Garvin Machine Co., New York City, has closed a contract with the China Import Co., to represent its interests in China during the next five years.

The Central Foundry Co., 3 Wall street, which recently suffered the partial destruction of its Anniston, Ala., plant by fire, with a loss of $50,000, has already begun the work of rebuilding. Foundations are in for a new plant to be slightly larger than that destroyed, but planned for the same line of product. The Central Iron & Coal Co., which is owned by this interest, is building the preparatory work for the pipe foundry which it is to build at Holt, Ala. The original plant will not be large but provision will be made for ample extensions later.

The Hardinge Conical Mill Co., 43 Exchange Place, is removing to larger offices at the same address. Among its orders recently it reports one of considerable size for Mexican shipment. One of its mills is operating on iron ore at an experimental plant in Pennsylvania.

Some important improvements, which will include engine and power equipment, are to be made at the Long Island City plant of the Eberhard Faber Pencil Co. The consulting engineers on the work are Griggs & Holbrook, 3 South William street.

The Harlan & Hollingsworth Corporation, Wilmington, Del., has awarded contracts to A. S. Reed & Bro. Co., of that city, for the construction of two large shop buildings for the manufacture of steel passenger cars. Most of the equipment for these shops will be supplied by local concerns, the Hilles & Jones Co., building the punching, bending and shearing machinery.

The Long Island railroad is making further purchases of equipment for the equipment of its tunnel services, being now in the market for 120 steel passenger motor cars. The electrical equipment of this system will be furnished by the Westinghouse Co.

PITTSBURG.

Contract for Equipment of Gary Plate Mills May Soon be Made.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., March 30.

Only a moderate amount of new business is being placed in machinery lines, although there are some promising inquiries in sight which are expected to develop soon. The present outlook is that the Gary plate mills will shortly be placed, although beyond this large project other advanced prospects for rolling equipment are not especially encouraging. There are several likely crane inquiries, each involving several machines, in the market, and some of these are expected to be disposed of the coming week. The foundry business in the Pittsburg territory is apparently less active than it was several months ago, and supplies and equipment for casting plants are moving more sluggishly.

The offices of the Standard Bridge Tool Co., Pittsburg, were moved April 1 from 709 Curry building to 716 Ferguson building, Fourth avenue, Pittsburg.

The Union Light & Power Co., capitalized at $10,000, has been incorporated by T. L. Cardwell, Plains, Pa.; B. C. Allen, Wilkesbarre, Pa.; O. E. Bennett, Dorranceton, Pa. Mr. Allen is treasurer.

Some improvement in the demand for crucible steel is noted. The Crucible Steel Co. of America has resumed operations at its Park works, Pittsburg, after an idleness of a number of months.

The Firth-Sterling Steel Co., Pittsburg, has taken an order from the government for furnishing 3,000 12-inch armor piercing shells for the navy department. The award was made the company at the rate of $197.50 per shell.

Makers of mill machinery are anticipating that definite action will shortly be taken on the plate mill inquiries for the Gary plant of the United States Steel Corporation. Figures on this installation, which will be a very large one, have been in for a long time, and much investigation has been made of the various types of construction. The indications are that an award will be made in the near future. All the principal rolling mill makers in the country are interested in this contract.

The Morgan Engineering Co., Alliance, O., is preparing to ship the large 152-inch plate mill which is to be installed in the plant of the Otis Steel Co., Cleveland. This mill is practically the largest of its size in the country and has 44-inch rolls. The mill has been set up in the works of the Morgan company at Alliance for several weeks, and has been inspected with much interest by steel works engineers from different parts of the country.

The Isabella-Connellsville Coke Co., of West Virginia, capitalized at $7,000,000, has been organized by Geo. H. Howell, M. A. Allen and W. J. Sturgis, of Uniontown, Pa., and H. G. Young and Stuart F. Reed, of Charleston, W. Va. The company has closed a deal for the purchase of 2,900 acres of coking coal rights in Luzerne township, Fayette county, Pa., which is one of the last undeveloped acreages in the lower Connellsville region. The purchase was made from J. V. Thompson, J. M. Hustead, Isaac W. Seamans, Geo. D. Howell and others. The company

has also bought the Gibson farm near-by its coal rights and expects to locate a modern coke plant upon this surface tract. The Pittsburg & Lake Erie railroad has bought the right-of-way for an extension of its tracks to the proposed plant. A bond issue of $1,250,000 is now being offered by the company.

Bids were considered in the past week by the DeForest Sheet & Tin Plate Co., Niles, O., for the building of the five sheet and the five tin plate mills for the new plant which the company will erect in that city. It is understood that the contract was practically placed, and that operations will go forward at once.

MILWAUKEE.

More Wisconsin Plants are Having Additions Made.

Milwaukee, Wis., March 29.—Prosperity seems to be expected by the various machinery and steel concerns of Wisconsin located outside of Milwaukee, judging from the new plants and additions which are being erected or planned for.

J. H. Johnson of Milwaukee has agreed to establish a new brass and aluminum foundry at Eau Claire, providing the city will give him one city lot for the erection of the plant. The necessary capital has been secured for the undertaking and indications are that the foundry will be erected.

The Janesville Machine Co., Janesville, Wis., is about to erect a large addition to be located directly opposite the present establishment and the work of erection will begin in the near future. An average of from five to seven carloads of machinery are shipped daily by the company.

The J. I. Case Threshing Machine Co., Racine, Wis., will erect a large and modern warehouse, 240 x 480 feet, of mill construction and fireproof, this season.

The Wisconsin Motor Mfg. Co. has been incorporated at Milwaukee with a capital stock of $50,000 by Charles H. John, Edward Schwartzburg and Fred C. Kuetemeyer, all of Milwaukee. The building formerly occupied by the Milwaukee Locomotive Works at North Milwaukee has been leased by the new company for the manufacture of automobile motors. It is expected that the plant will be in full operation within three weeks. The engine will be a four-cylinder motor of standard type, but will be more expensive and of better construction than the average engine.

The Fred M. Prescott Steam Pump Co., West Allis, has been awarded a contract for the installation of a new pump with a capacity of 6,000,000 gallons daily at the plant of the Kenosha City Water Co., Kenosha, Wis. The contract price is $18,850.

More than 160 young men are now enrolled as pupils at the Milwaukee school of trades taking work in the classes covering machine design, pattern making, woodwork and plumbing. Manufacturers in general are well pleased with the training offered to apprentices.

It is reported that the Central Foundry Co. of Milwaukee, is considering the erection of a new steel casting foundry at Eau Claire, Wis. John Manning of this company was a recent visitor at Eau Claire and the matter of exact location was considered with leading business men.

CINCINNATI.

March Sales Show Improvement, but at Expenditure of Much Effort.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., March 30.

The month of March has been slightly better than February, in the machine tool business although the increase is not important. The encouraging feature during the past month has been that orders were more evenly distributed among the plants and practically all of the shops secured some business. In February there were some shops that secured so little business that there was serious talk of shutting down. This condition has not existed in March and the general tone in the trade is decidedly more encouraging. There is the same hesitancy on the part of purchasers to place orders that has been noticeable for some time and it is requiring all the skill of the selling departments of the manufacturers to procure the orders they are getting. Some good sized inquiries are under consideration but on each inquiry it takes considerable urging to secure an order. With prompt deliveries available for nearly every machine on the market and with manufacturers using every effort to make sales the difficulties surrounding the securing of orders can be readily appreciated.

It is observed that the consideration of purchases of machine tools is still being deferred by plants which really should have the equipment. But manufacturers are not yet prepared to assume that business is established on the up-grade to a sufficient extent to justify additions to equipment and although individual experiences of a succession of several months of good business are found, the managers of the successful plants seem still inclined to delay making expenditures under the apprehension that a period of dullness may again set in.

The Lodge & Shipley Machine Tool Co. has completed the extensions to its offices and the new private offices of the heads of departments are ready for occupancy this week. The company reports orders in March decidedly better than during February, and some large contracts are being taken under consideration.

The purchase of a piece of ground on Spring Grove avenue and Hopple street, having a frontage of 271 feet for $7,000 by Frank Folz acting for an eastern concern has created some interest in machine tool circles. It has been reported that the purchase of the property was for the erection of a machine tool plant, and the fact that the property is located in the heart of machine tool factory district lends color to the report. Mr. Folz withholds the names of the principals for whom he is acting.

EMPLOYERS' ASSOCIATION OF OREGON.

For the purpose of binding together more closely the employing interests of their state, the leading manufacturers of Portland have organized the Employers' Association of Oregon. The organization of this body marks another step in the progress of the open shop movement on the Pacific coast.

The chief objects of the new association, as set forth in its declaration of principles, are: "To secure for employers and employes the freedom of individual contract in the matter of employment, irrespective of whether or not an employer or employe is a member of any organization and to oppose restriction of output, sympathetic strikes, boycotts and illegal persecutions of individuals, all of which are a menace to the industrial progress of our country and tend to the undermining of constitutional rights."

The association, which has been sponsored by the iron and steel manufacturers, began its corporate existence Feb. 2, 1909. Its officers are as follows: Wm. H. Corbett, president; C. W. Hodson, vice president; Everett Ames, secretary; E. L. Thompson, treasurer. The association offices are located at rooms 222-3-4-5 Commercial Club building, Portland, Ore.

PIG IRON MANUFACTURERS PROTEST

Are Opposed to Free Ore and to Reduction of Duty on Scrap—Wm. G. Mather Argues Against Removal of Ore Duty—Pacific Coast Pleased With Nearly All Features of the Payne Bill—Workingmen Desire Change in Drawback Provisions for Tin Plate

At a meeting of the pig iron manufacturers held at Cleveland, March 24, the tariff bill as pending in the house of representatives was considered by the meeting and the following resolutions were adopted:

Whereas, the present revised tariff bill pending in the house of representatives places iron ores on the free list, and has reduced the present tariff on pig iron from $4 to $2.50, a ton, and the present duty on scrap iron and scrap steel from $4 to 50 cents a ton, and

Whereas, such reduction of the present tariff and the placing of iron ore on the free list will very injuriously affect the business interests represented at this meeting,

Now be it resolved: That it is the sense of this meeting that if a reduction in the tariff on iron ore is made it should not exceed 25 per cent of the the present rate of duty, and

Be it further resolved, That reducing the duty on scrap iron and scrap steel below the duty on pig iron will simply be ruinous to the merchant blast furnaces of the United States in all sections, for the reason that foreigners will evade the law by breaking up pig iron and other material into scrap shapes, resulting in a practical reduction of the duty on all of the material to 50 cents a ton, and

Be it further resolved, That for this reason we earnestly protest against permitting the duty on scrap iron and scrap steel to be less than the duty on pig iron, it being the judgment of the interests represented at this meeting, that the present rate of duty on scrap iron, scrap steel and pig iron should not be reduced in excess of 25 per cent of the present rates, and that in any event the duty on scrap steel and scrap iron should be the same as the duty on pig iron.

Be it further resolved, That the chairman of this meeting be and he is hereby requested to have copies of this resolution prepared and forwarded to the senators of the United States and to the members of the ways and means committee of the house of representatives at Washington, and to such other members of the house, as he may deem wise.

The Injustice of Free Ore.

The following letter from Wm. G. Mather, president of the Cleveland-Cliffs Iron Co., and of the Lake Superior Iron Ore Association, to Hon. H. O. Young, member of Congress from Michigan, is self-explanatory:

I have your admirable letter of March 18 on the iron ore tariff situation.

Undoubtedly the removal of the tariff entirely from iron ore will greatly increase competition which must be sustained by the owners of iron mines in this country, particularly those in Lake Superior, because they produce the bulk of the ore. This, perhaps, would not be very evident this year, but the tendency to this competition would, of course, increase as the years rolled on. Canadian developments, which have been somewhat held back by the tariff, would now go on very much more freely and vigorously. Competition from Cuba and Spain, which countries have the advantage over us in very cheap labor, and also in the cost of transportation to the eastern districts of the United States, would be severe in two ways, viz.:

First—In preventing us from shipping any ore east of the Alleghenies in competition therewith, and

Second—In enabling the iron and steel manufacturers east of the mountains to manufacture their goods more cheaply, and, therefore, ship them farther to the west in competition with goods made west of the mountains.

The above is one phase of the question. There is also another phase, viz., that if the tariff be taken off from iron ore entirely, it is not being treated fairly. The reductions on many forms of finished iron and steel, though in themselves quite great, really amount to nothing because the amount of tariff still left prohibits competition from Europe. Take, for example, the Pennsylvania Steel Co., the Maryland Steel Co., and the Bethlehem Steel Co., owning as they do properties in Cuba. They employ cheap labor of that country. All the capital used in its development is spent out of the country. They bring the cheap raw material to their furnaces, and the goods made therefrom, still protected so that there is no chance for competition from abroad, are then placed in a more favorable position for competition with people who solely use Lake Superior ores or American ores in general, than they were before. Therefore, the reduction of the tariff has not been equitably distributed.

Then again in the matter of lumber. It has been decided to only cut the tariff in two instead of reducing it altogether. Mr. Pinchot makes the argument, following what the lumbermen have said, and I believe both he and they are right, that the maintenance of higher prices through the duty which lessens competition will further the interests of scientific forestry, in that it keeps up prices and enables the lumbermen to utilize the lower grades which would otherwise be left in the forest.

Our stumpage prices in this country are so high that the lumbermen would be tempted to only take out the good logs and good trees, leaving the poorer ones behind to be destroyed by fire and to deteriorate in other ways, because it would not pay to utilize them, as they produce only cheap forms of lumber and wood products in competition with the same material coming in from Canada where stumpage prices are very low, and the taxes for holding timber less burdensome than in this country.

Now, then, to a certain extent, this course of reasoning is applicable to iron ore. If, through free ore, prices decline and labor still keeps up, then the tendency will be to take out from the mines only the first-class ores and to do it as cheaply as possible, the result being that, after this good ore is removed, the mines will collapse when abandoned and the lean ores, of which there are millions of tons in the Lake Superior district, will be lost at least in those particular mines. It would not pay to take out some of the lean ore with the high grade ore paying the high taxes to which the mines are subjected, if prices should decline.

The argument of the lumbermen and Mr. Pinchot that the retention of some duty on forest products really conduces to good forestry and proper conservation of resources, is, I think, quite as applicable to our deposits of iron ore on account of the above illustration.

Why should the iron ore business, therefore, be treated less favorably in this tariff matter than the forest and lumbering industry? In other words, although the time has undoubtedly come for a reduction of tariffs (I am heartily in sympathy with it) yet it is the height of injustice when the process of reduction is being carried on, to discriminate in favor of one side of manufacturers and producers as against another, all of them having been developed under the conditions growing out of a governmental policy of protected tariff.

Yours truly,

WM. G. MATHER.

Cleveland, March 20.

DUTY ON ZINC

Pleases Miners of That Metal—Comment on Pig Iron Rate.

St. Louis, March 29.—While declining to express themselves, the large iron and steel interests in the St. Louis territory are evidently fearful that their industries will be injured by the schedule prepared by the ways and means committee, and will lend all the assistance in their power, it is believed, to have the schedule corrected by the senate.

The cost of manufacturing pig iron in foreign countries, Germany in particular, it has been estimated by some dealers, does not exceed $8 to $8.50 a ton, and if this iron is permitted to come into the United States free of duty, with the phenomenally low freight rates the importers will have to pay, it will be almost ruinous to home industries. It is conceded that some furnaces in the United States can produce pig iron at $9 under certain conditions, while $14 to $15 is the minimum figure

at which it can be manufactured by others. What seems to be wanted by the pig iron men, is a tariff that will protect the industry in this country under all conditions.

The recommendation by the ways and means committee to place a duty of 1 cent on every pound of zinc imported into the United States has been received with exclamations of satisfaction in the Missouri-Kansas-Oklahoma district, and has had the effect of stimulating the production of ore there far beyond anything that has occurred for many months.

DRAWBACK PROVISION

Is Not Satisfactory to Tin Plate Workers—Make Protest.

Tin plate workmen, through representatives of the Amalgamated Association of Iron, Steel and Tin Workers, are protesting against the adoption in its present liberal form of the drawback clause in the Payne tariff bill. This clause provides that when material is imported to this country for manufacture here and then exported as a finished article, a drawback of 99 per cent of the duty originally paid shall be granted to the exporting company. In the case of tin plate, thousands of boxes from foreign mills are imported annually, worked up into cans and into other finished forms and again shipped abroad containing various American food stuffs and goods. The tin plate workers declare that the drawback feature puts a premium upon the consumption of foreign material by this class of American exporters and detracts that much from the prosperity of the domestic industry.

The drawback clause in the Payne bill broadens the provision of the Dingley bill in this regard, as it only requires that finished material containing tonnage equal to that of the tin plate imported shall be exported in order to obtain the rebate from the duty. The Dingley bill specified that the particular tin plate imported should be that used in the exported finished article, for the drawback to be available.

The section of the Payne bill pertaining to the drawback privilege is as follows:

On the exportation of articles manufactured or produced in the United States either in whole or in part of imported materials, or from domestic materials of equal quantity and productive manufacturing quality and value, such question to be determined by the secretary of the treasury, there shall be allowed a drawback equal in amount to the duties paid on the imported materials used, or where domestic materials are used, to the duties paid on the equivalent of imported materials, less the legal deduction of 1 per cent: Provided, that the exportation shall be made within three years after the importation of the foreign material used or checked against. And provided further: That the quantity of materials used and the amount of duties paid shall be ascertained, the facts of the manufacture or the production of such articles in the United States and their exportation therefrom, and the equality of domestic and imported materials where the former are substituted for the latter with respect to quantity and productive manufacturing quality and value shall be determined, and the drawback due thereon shall be paid to the manufacturer, producer or exporter, to the agent of either, or to the person to whom such manufacturer, producer, exporter or agent shall, in writing, order such drawback paid, under such regulations as the secretary of the treasury shall prescribe.

PACIFIC COAST

Pleased With Lower Iron and Scrap Duties, But Not With Lumber Clause.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Mar. 24.

Aside from practically universal dissatisfaction over the reductions in the lumber scale, the provisions of the Payne tariff bill are meeting general approval on the Pacific coast. It is feared by some that the reductions in lumber will admit large amounts of low grade Canadian timber, sawed by Japanese and similar cheap labor and that the local production of rough lumber, in which the labor item is the largest charge, will be seriously curtailed. Any serious blow to the lumber industry of the west would also strike heavily at the iron, steel and foundry business.

The current sentiment of the Pacific coast regarding those parts of the Payne bill that directly affect the duties on iron ore and iron and steel products is generally one of satisfaction. The coast is not a producer of these materials to any appreciable extent. As a consumer it is in favor of any reductions in the iron and steel schedule that will lower the price of raw materials and so stimulate manufacturing.

The chief interest centers about the proposed reduction in the tariff on pig iron from $4 to $2.50 per ton. The Pacific coast foundries are large melters of foreign iron. A reduction of $1.50 in the duty on pig will result in the same reduction in the price of iron in the Pacific coast markets and will therefore directly affect the foundryman's costs. The announcement of a cut of $3.20 a ton in the transcontinental freight on iron from Alabama furnaces has already been made. This, followed by the tariff reduction, will result in permanently lower priced iron on the Pacific coast. As a consequence, the local foundries will be in a position to obtain contracts for a larger share of the tonnage originating in their own territority than heretofore and the shops in the Mississippi valley will do less business on the Pacific coast. The proposed tariff reduction is also sufficient to maintain the present ratio between foreign and domestic iron and to prevent any increased consumption of Alabama iron on the coast, in spite of the recent reduction of the trans-continental freight rate.

The reduction on scrap iron from $4 to 50 cents a ton will benefit the Pacific coast foundries by permitting the importation of considerable quantities of foundry scrap from Canada. In prosperous times the supply of scrap on the coast is not adequate; the Pacific coast foundry mixtures usually contain 50 per cent scrap and the foundrymen welcome any additions to the territory from which this material may be drawn.

The other reductions, particularly those on bar iron, are met with general favor. The reduction on cast iron pipe is opposed by the leading Pacific coast manufacturer of this product.

A large share of the Pacific coast's iron ore is in Canada, so the placing of ore on the free list is particularly welcome to the local blast furnace industry.

In short, to quote the words of a leading manufacturer of lumbering machinery, "the new tariff is regarded on the Pacific coast much as it is in other sections of the country—as a somewhat mixed blessing."

CALIFORNIA PLEASED,

But Not Unmindful of the Interests of the East.

San Francisco, March 24.—The full text of the new tariff bill has not yet reached California, but as far as is known the terms will satisfy most, if not all Californians. There are exceptions. The lumber interests in the northern part of the state feel injured on account of the reduction in duty on lumber.

Californians want protection for the articles they raise and sell, and in that respect they do not differ from

the people of other sections of the country. But they are just broad-gauge or wise enough to realize that protection for their eastern brethren is essential to the welfare of California, for they look to the east to buy California products. The crop prospects in California are excellent, but it will not profit California unless the east has the money to buy California fruits and other products.

The temperance agitation throughout the country has injured the wine industry of California so as to demonstrate how closely the interests of the east and west are interwoven. The price of grapes has dropped from $30 to $6 a ton, not enough to pay for the picking, and there are several hundred millions invested in that industry in California. When the east is hit, California feels the pain.

INCREASED COMPETITION

In the Middle West Predicted—Comments of Milwaukee Manufacturers.

Milwaukee, Wis., March 29.—The general opinion of Milwaukee machinery manufacturers and iron and steel men in regard to the proposed reduction of the steel tariff is that the cut will not so seriously affect the middle west as was earlier anticipated. It is conceded that the reduction will affect directly the far east and far west, but that the only probable result in the middle west will be to increase local competition. The view expressed by Thomas J. Neacy, president of the Fifer & Stowell Co., well known machinery manufacturer, is an excellent indication of the sentiment in Milwaukee.

"The reduction in the steel tariff will affect Milwaukee and the middle west but very little," said Mr. Neacy, "although the effect will be noticed on both coasts. In my opinion, the proposed change in the tariff will result in shutting off the middle west from the east and west. This will naturally result in making competition more severe and this way, we will be affected. What the country wants is a national tariff commission working all of the time."

Representatives of the Allis-Chalmers Co. believe that should the Payne bill be passed, the resulting effect on the machinery business would not be great. Members of the purchasing department were of the opinion that the Payne bill is only a substitute and that another measure will be presented before congress later.

Officials of the Wisconsin Bridge & Iron Co. expressed the opinion that the proposed cut in the tariff would not seriously affect the structural iron and steel business except to prevent the charging of unusually high prices in times of prosperity. A greater cut than that proposed by the Payne bill was not favored, however.

George Gibbs, Milwaukee manager of the Scully Steel & Iron Co. believed that it would be hard for foreign shippers to get into the United States to an extent, that would seriously affect the iron and steel trade outside of the east and west. He was sure that the great mills at Gary, etc., would continue to satisfy the demands of the middle west.

Milwaukee officials of the Illinois Steel Co. were not in favor of the proposed reduction in the tariff. At this early date, they were uncertain as to the complete effect, but the fear of the tariff tinkers is not curtailing operations at the Milwaukee plant. Blast furnace No. 1 was recently blown in and present business would indicate that Furnace No. 2 might be blown in within the near future.

LOWER WAGES

Predicted for the South—Possible Results of Free Ore.

Birmingham, Ala., March 29.—The manufacturers of pig iron, the miners of coal and ore, and kindred manufacturers and miners, in the Birmingham district, are having much to say anent the proposed revision of the tariff. There is not much to say on the reduction of duty on ore except to the effect that Cuban ores and ores from other countries can be brought to our shores, warranting the erection of furnaces and steel plants at the coast to the detriment of those already built in the interior and in other districts. In this state, it is set forth that Cuban ores could be brought to Mobile, which is but a short distance from the Alabama coal fields, and that fluxing stone could be secured in the immediate neighborhood, all to the detriment of the many furnaces and steel plants which are already built in the Birmingham district.

Guy R. Johnson, vice president and general manager of the Alabama Consolidated Coal & Iron Co., says that if the Payne bill is adopted the Alabama companies will be compelled to cut the wages to meet those in England and make other reductions that will be felt in the entire section. Said he: "Cleveland, England, iron was quoted last week at $11.58, adding to this $2 for transportation to our Atlantic seaboard, and $2.50 for proposed tariff, we get a total of $16.08. Substract from this the very best Birmingham freight rate to New York, by rail or water, which is $4.25, and we have left $11.83, as the price of Birmingham No. 2 pig. There is no profit in this figure to the average manufacturer in the district." J. W. McQueen, vice president of the Sloss-Sheffield Steel & Iron Co. said: "Any material reduction in the duty on pig iron or coal would affect this district adversely. A reduction on the iron tariff would affect this district more than any other, owing to the fact that the largest proportion of pig metal here is sold along the Atlantic coast or in close proximity to it, and we have to pay from $4.25 to $4.60 per ton in reaching the territory from Philadelphia to Boston." Others gave similar views. The representative in congress from districts where pig iron is manufactured or coal and ore are mined, have been advised as to the situation, while both the senators who reside in the industrial section of Alabama, have been fully advised also.

FORMAL DEMAND

Made by Canadian Corporation for Tin Plate Duties.

Toronto, Canada, March 26.—The Canadian Sheet Steel Corporation, owner of the tin plate plant at Morrisburg, Ont., has made formal demand upon the government for duties upon its product as follows: On tin plate a minimum duty under the preferential tariff of 12½ per cent, and a duty against the United States of 15 per cent; on galvanized plates and sheets all gages and up to 42 x 84 inches in size, a minimum duty of 10 per cent; duty against United States, 15 per cent; on Canadian plates and sheet steel of all gages up to No. 14 and sizes up to 42 x 84 in minimum duty 5 per cent; duty against United States 10 per cent; on galvanized plates and sheets Canadian plates and sheets and rolled sheet steel there is already a general duty of 5 per cent though they are admitted free from Great Britain. In support of the demand the corporation adduces figures shown by the extent of the imports in these lines calculated that at the rate of duty proposed the revenue on last year's imports would have amounted to $655,815. It states that the plant at Morrisburg has cost $400,000, and is capable of producing one-fifth part of the total requirements of the country. If necessary its capacity could quickly be doubled. A large deputation of business men from the Morrisburg district interviewed Hon. George P. Graham, minister of railways, on the 23d inst., urging the imposition of the duty and an active lobbying in favor of the measure has been set on foot.

IMPORTANT CHANGES

In Specifications of Manufacturers for Steel Rails.

Much interest and public discussion have followed the announcements of the various specifications for Bessemer and open-hearth steel rails adopted by the different railroad systems of the country for 1909 delivery. Little, however, has been said of the views of the rail makers themselves as to what constitutes a sound rail rolled from either Bessemer or open-hearth steel.

In the revised standard specifications for Bessemer rails which the manufacturers of the United States and Canada put into effect Jan. 1, 1909, some important changes over former specifications have been made. Under the drop test provided, a 1-foot less drop is required and the classification of weights per yard has undergone some change, the new limits being 71 to 80 pounds for 16-foot drop, 81 to 90 pounds for 17-foot drop and 91 to 100 pounds for 18-foot drop. The former arrangement was 75 to 79 pounds for 17-foot drop, 80 to 89 pounds for 18-foot drop and 90 to 100 pounds for 19-foot drop. A new clause governing the temperature of the pieces used in the drop testing operation has been added as follows: "The temperature of the test pieces, when tested, shall not be less than 60 degrees Fahr., nor greater than 120 degrees Fahr."

The section is limited to that recommended by the American Society of Civil Engineers. Formerly the designation of the section of the American Society of Civil Engineers was qualified by the words "unless otherwise specified."

Under the branding clause, the following has been added: "If desired, a letter shall be stamped on the side of the web to indicate the portion of the ingot from which the rail was rolled." This provision is of considerable significance in view of the demands of the railroads as to the discard from the bloom or the cropping of the ingot. The complete specifications for Bessemer rails now in force are as follows:

SPECIFICATIONS FOR STANDARD BESSEMER STEEL RAILS. FOR A. S. C. E. SECTIONS.

Jan. 1, 1909.

(1) CHEMICAL COMPOSITION

	50 lbs. up to 60 lbs.	61 lbs. up to 70 lbs.	71 lbs. up to 80 lbs.	81 lbs. up to 90 lbs.	91 lbs. up to 100 lbs.
Carbon	0.35 to 0.45	0.35 to 0.45	0.40 to 0.50	0.43 to 0.53	0.45 to 0.55
Phosphorus	not over 0.10	not over 0.10	not over 0.10	not over 0.10	not over 0.10
Silicon	not over 0.20	not over 0.20	not over 0.20	not over 0.20	not over 0.20
Manganese	0.70 to 1.00	0.70 to 1.00	0.75 to 1.05	0.80 to 1.10	0.84 to 1.14

(2) SHRINKAGE

The nmber of passes and speed of train shall be so regulated that on leaving the rolls sections 75 lbs. per yard and heavier will not exceed that which requires a shrinkage allowance at the hot saws of 6 7/8 inches for a 33-foot 75-lb. rail, with an increase of 1/8 inch for each increase of five pounds in the weight of the section.

No artificial means of cooling the steel shall be used after the rails leave the rolls, nor shall they be held before sawing for the purpose of reducing their temperature.

(3) DROP TEST

One drop test may be made on a piece of rail not less than 4 feet and not more than 6 feet long, selected from each blow of steel.

The rails shall be placed head upward on the supports and the various sections shall be subjected to the following impact tests under a free falling weight:

Weight of Rail per Yard.	Height of Drop in Feet.
71 to 80 lbs.....	16
81 to 90 lbs.....	17
91 to 100 lbs.....	18

If any rail breaks when subjected to the drop test, two additional tests will be made of other rails from the same blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected; but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

The drop-testing machine shall have a tup of 2,000 pounds weight, the striking face of which shall have a radius of not more than 5 inches, and the test rail shall be placed head upward on solid supports three feet apart. The anvil block shall weigh at least 20,000 pounds, and the supports shall be part of, or firmly secured to the anvil. The report of drop test shall state the atmospheric temperature at the time the test was made. The temperature of the test pieces, when tested, shall be not less than 60 degrees Fahr., nor greater than 120 degrees Fahr. The testing shall proceed concurrently with the operation of the mill.

(4) SECTION

The section of rail shall be that recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company consistent with clause No. 5, relative to specified weight. An allowance in height of 1/64 of an inch under, and 3/32 of an inch over and in width of 1/8 inch will be permitted. A perfect fit of the splice bar shall be maintained.

(5) WEIGHT

The weight of the rails shall be maintained as nearly as possible, after complying with clause No. 4, to that specified in contract. A variation of ½ of 1 per cent for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

(6) LENGTH

The standard length of rails shall be 30 or 33 feet. Ten per cent of the entire order will be accepted in shorter lengths, varying by even feet down to 24 feet. A variation of ¼ of an inch in length from that specified will be allowed.

(7) BRANDING

The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of the heat shall be so stamped on each rail as not to be covered by the splice bars. If desired a letter shall be stamped on the side of the web to indicate the portion of the ingot from which the rail was rolled.

(8) DRILLING

Circular holes for splice bars shall be drilled in accordance with specifications of purchaser. They shall in every respect accurately conform to drawing and dimensions furnished and shall be free from burrs.

(9) FINISHING

Rails shall be carefully hot straightened so as not to vary, throughout their entire length, more than 5 inches from a straight line in any direction when delivered to the cold straightening presses. Those which vary beyond that amount or have short kinks shall be classed as No. 2 rails and shall be so stamped. The distance between supports of rails in the gagging press shall not be less than 42 inches. Rails shall be straight in line and surface when finished—the final straightening being done while cold—smooth on head, sawed square at ends—variations therefrom to be not more than 1/64 inch—and prior to shipment, shall have the burr caused by the saw cutting removed and the ends made clean. No. 1 rails shall be free from injurious defects and flaws of all kinds.

(10) INSPECTION

The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times while his contract is being executed, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the rails are being made in accordance with the terms of the contract. All tests and inspection shall be made at the place of manufacture prior to shipment, and shall be so conducted as not to unnecessarily interfere with the operation of the mill. The manufacturer shall furnish the inspector, daily, with carbon determinations of each heat, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel for each day and night turn. Analyses shall be made on drillings taken from small test ingots, the drillings being taken at a distance of not less than ¼ inch beneath the surface of said test ingots. On request of the inspector, the manufacturer shall furnish drillings for check analysis.

(11) NO. 2 RAILS

Rails which by reason of surface imperfections are not classed as No. 1 rails, shall be considered No. 2 rails; but No. 2 rails shall not be accepted for shipment which have flaws in the head of more than ¼ inch; or in the flange of more than ½ inch in depth; and these shall not, in the judgment of the inspector, be, in any individual rail, so numerous or of such a character as to render it unfit for recognized No. 2 rail uses.

(12) DESIGNATION OF NO. 2 RAILS AND SHORT LENGTHS OF NO. 1 RAILS

Both ends of all No. 2 rails shall be painted white. Both ends of all short length No. 1 rails shall be painted green.

Open-Hearth Specifications.

The standard specifications of the manufacturers for open-hearth rails, which also went into effect Jan. 1, 1909, are especially important in view of the recent increased demand for sections rolled from this grade of steel. Practically every rail mill in the

United States and Canada can produce rails to the standard therein fixed, although the operation in some cases is not so advantageous owing to the absence of open-hearth furnace capacity and the necessity of obtaining the blooms from outside works. The open-hearth specifications are the same as Bessemer rails excepting as modified in the following paragraphs:

SPECIFICATIONS FOR STANDARD OPEN-HEARTH STEEL RAILS. FOR A. S. C. E. SECTIONS.

Jan. 1, 1909.

(1) CHEMICAL COMPOSITION

	50 lbs. up to 60 lbs.	61 lbs. up to 70 lbs.	71 lbs. up to 80 lbs.	81 lbs. up to 90 lbs.	91 lbs. up to 100 lbs.
Carbon	0.46 to 0.59	0.46 to 0.59	0.52 to 0.65	0.59 to 0.72	0.62 to 0.75
Phosphorus	not over 0.04	not over 0.04	not over 0.04	not over 0.04	not over 0.04
Silicon	not over 0.20	not over 0.20	not over 0.20	not over 0.20	not over 0.20
Manganese	0.60 to 0.90	0.60 to 0.90	0.60 to 0.90	0.60 to 0.90	0.60 to 0.90

(3) DROP TEST

One drop test may be made on a piece of rail not less than 4 feet and not more than 6 feet long, selected from each heat of steel.

The rails shall be placed head upward on the supports and the various sections shall be subjected to the following impact tests under a free falling weight:

Weight of Rail per Yard.	Height of Drop in Feet.
50 to 60 lbs.....	15
61 to 70 lbs.....	16
71 to 80 lbs.....	16
81 to 90 lbs.....	17
91 to 100 lbs.....	18

(7) BRANDING

The name of the maker, the weight of the rail, and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of the heat and the letter O. H. (to designate the grade of steel) shall be so stamped on each rail as not to be covered by the splice bars. If desired a letter shall be stamped on the side of the web to indicate the portion of the ingot from which the rail was rolled.

(10) INSPECTION

The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times while his contract is being executed, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the rails are being made in accordance with the terms of the contract. All tests and inspection shall be made at the place of manufacture prior to shipment, and shall be so conducted as not to unnecessarily interfere with the operation of the mill. The manufacturer shall furnish the inspector a chemical analysis of each heat of steel covering the elements specified in Section (1) hereof. Analyses shall be made on drillings taken from small test ingots, the drillings being taken at a distance of not less than ¼ inch beneath the surface of said test ingots. On request of the inspector, the manufacturer shall furnish drillings for check analysis.

No change has been made in the specifications for standard steel splice bars.

The Carpenter Steel Co., Reading, Pa., has announced a 10 per cent wage reduction.

FORTHCOMING MEETING IN LONDON OF THE IRON AND STEEL INSTITUTE.

Arrangements are now complete for the annual general meeting of the Iron and Steel Institute which is to take place in London on Thursday and Friday, May 13 and 14. The meeting will be held in the rooms of the Institution of Civil Engineers and the Council will present its report and the statement of accounts for 1908. The retiring president, Sir Hugh Bell, Bart., will induct into the chair the president-elect, Sir William T. Lewis, Bart, whose first duty will be to present the Bessemer gold medal for 1909 to Mr. A. Pourcel, of Paris. The president will then deliver an inaugural address and a selection of the papers will be read and discussed.

The meeting will be resumed on the following day, Friday, and will be devoted almost wholly to the further reading and discussing of papers. The awards of the Andrew Carnegie scholarships for 1909 will also be announced. At 7 o'clock in the evening, the annual dinner will take place as usual in the grand hal of the Hotel Cecil.

The following is a list of the papers that are expected to be submitted:

"On the Production of Iron Sheet and Tubes in One Operation," by S. Cowper-Coles (London).

"On the Protection of Iron and Steel From Corrosion," by A. S. Cushman (Washington, U. S. A.).

"On the Manufacture of Peat Fuel," by Dr. M. Ekenberg, M. A. (London).

"On the Chemical Physics Involved in the Decarburization of Iron Carbon Alloys," by W. H. Hatfield (Sheffield).

"On the Relation of the Solubility of Iron and Steel in Sulphuric Acid to Its Heat Treatment," by Prof. E. Heyn and O. Bauer (Gross-Lichterfelde).

"On the Bristol Recording Pyrometer," by P. Longmuir, B. Met., and T. Swinden (Sheffield).

"On a Heat-Treatment Study of Bessemer Steels" by Prof. A. McWilliam and E. J. Barnes (Sheffield).

"On the Roechling-Rodenhauser Electric Furnace," by Rodenhauser (Sarrsbrucken).

"On the Value of Physical Tests in the Selection and Testing of Protective Coatings for Iron and Steel," by J. Cruickshank Smith (London).

"On Further experiments on the Ageing of Mild Steel," by C. E. Stromeyer (Manchester).

"On a Comparison of the Methods of Determining the Hardness of Iron and Steel." by Prof. T. Turner (Birmingham).

"On the Rusting of Iron, and Modern Methods for Its Prevention," by Prof. W. H. Walker (Boston, U. S. A.).

ENGINEERS ON CONSERVATION OF NATURAL RESOURCES.

The joint meeting of the four great engineering societies, held at the Engineering Societies' building in New York city, March 24, in the interests of conserving the country's natural resources, was well attended. President Taft sent the following telegram:

Please say to the joint engineering societies that I am greatly gratified to know of their co-operation in the movement for the conservation of the natural resources of the country. The members of these societies, with their technical knowledge, are not only better advised as to the necessity for such conservation, but are more competent to suggest the methods by which such conservation can be carried out.

I have already pledged the administration to as full support as possible of the policy, and I am glad to renew my expression of sympathy with the movement, and to state my high estimate of the value of the aid which can be rendered by the united engineering societies.

WILLIAM H. TAFT.

Speaking on the conservation of water, John R. Freeman, consulting engineer of the New York city additional water supply, said:

By far the most beneficent policy of conservation of its water power that the state or the nation can adopt is one which will tend toward its being devoted to the founding of industrial communities, and that kind of industry is best which will bring the greatest population per horse power and the most highly skilled class of operatives. The first step in such a policy of conservation is an accurate inventory and publication regarding each undeveloped or scantily developed opportunity.

Other addresses were delivered by Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, Charles Whiting Baker, editor of the *Engineering News*, and Lewis B. Stillwell.

RAILROAD NOTES.

Changes Among Pennsylvania Officers—Settlement of Buffalo Coal Rate.

Several important changes in the management of the Pennsylvania railroad have been announced by the new board of directors. W. W. Atterbury, general manager, has been appointed fifth vice president; W. Hayward Myers, general superintendent of the Northern Central railway and Erie division, has been made general manager; J. F. Fahnestock, assistant treasurer, has been named treasurer to succeed Henry Tatnall, who will become fourth vice president; John P. Green declined re-election as first vice president because of impending retirement under the company's pension regulations; Charles E. Pugh became first vice president, Samuel Rea, second vice president and J. B. Thayer third vice president.

The Lake Superior demurrage bureau handled 22,848 cars in February, the smallest number since July, 1908. The Chicago bureau handled 180,823 cars for the same month compared with 137,766 cars the corresponding month last year. The Pittsburg bureau reported 163,027 cars handled in February compared with 122,742 cars in the corresponding month last year.

Shippers have been advised that effective from Buffalo April 15, and from other points along the New York Central April 19, the minimum weight on iron and steel, scrap iron, scrap tin, pressed or in bales, when shipped in box or stock cars, will be 20 gross tons flat. At present there is provision made for 15 gross tons in car lots when the marked capacity of the car is less than 20 tons.

Since the wage schedules of the Grand Trunk Pacific, Canadian Northern and Canadian Pacific expire May 1, the labor federation of employes are drawing up new ones which are said not to be drastic.

Following a number of conferences the Trunk Line Association has granted a 4c "at and east" of Buffalo for wheat compared with 5½c a year ago. No reduction has been made in corn and oats. The new wheat rate will take effect April 20 and will continue for 60 days.

Circulars have been issued by railroads interested announcing that the demands of the Black Rock Shippers' Associaton on coal and coke carrying rates from the Pittsburg district have been granted. After May 1 the rate on such shipments to the Black Rock district will be reduced 5 cents a ton. Some time ago the railroads suggested increasing the rate to Buffalo 5 cents, thus placing both upon the same but increased basis. This brought forth strong protests from Buffalo. The present rate from Pittsburg to Buffalo are $1.65 a ton on coke, and $1.25 a ton on coal.

Another step in the contest inaugurated by the Boston & Maine through reduced rates to capture westbound import freight along the Atlantic seaboard, the Pennsylvania railroad has announced that after May 1 it will quote reduced rates on such freight from New York, Philadelphia and Baltimore ranging from 1 cent to 4 cents per 100 pounds, according to classification.

The board of directors of the Pennsylvania railroad, in its discretion, has been empowered to increase the company's indebtedness $80,000,000.

STEEL MILL ENGINEERS VISIT SCHENECTADY.

About 50 prominent steel mill engineers from all parts of the United States accepted an invitation to visit the works of the General Electric Co. at Schenectady on March 9, 10 and 11. The object of the visit was to study the design and construction of the General Electric Co.'s apparatus, which is of particular interest in connection with steel mill work. The engineers were welcomed by Major J. M. Andrews, of the power and mining department and Mr. Rushmore. A number of papers were read at the various meetings of the engineers, one of them by W. L. R. Emmett of the mining department whose subject was "Steam Turbines". Mr. Emmett discussed not only the standard form of high pressure turbine but the low pressure and mixed pressure units. His talk was illustrated by drawings and sketches. Centrifugal compressors were also discussed by L. C. Lowenstein, his talk being illustrated with lantern slides. The afternoon was devoted to an inspection of the turbine shops and power stations, together with the switchboard department. A special car then took the party to Albany where accommodations had been reserved at the Hotel Ten Eyck.

On Wednesday a technical session was held, a paper being read by K. A. Pauly, of the power and mining department, the subject being "Mill Type Motors". Mr. Pauly discussed the question of direct vs. alternating current for the operation of complete plants. The discussion which followed was taken part in by the visiting engineers. It was shown that complete alternating current mill equipment could be installed at a cost of about 20 to 25 per cent lower than could the direct current equipment. This statement applies particularly to large new installations. Mr. Pauly also described and illustrated with lantern slides, the 6,000 and 2,000-horsepower motors, which were built and installed by the General Electric Co. at the Gary plant of the Indiana Steel Co. Following Mr. Pauly's paper, H. E. White, of the controller engineering department discussed the design and operation of automatic control equipments.

After luncheon, which was served at the company's restaurant, practical demonstrations were given of operations described during the morning. Mill type motors of both alternating and direct-current types, were shown, operating under all conditions. Various types of control equipment were wired up to the motors and the engineers were given opportunities to operate these themselves. After the inspection of the motors and control equipment in operation the controller shops were inspected and the various types of control, both automatic and hand operated were exhibited, including the equipment for a 6,000-horsepower motor. Dinner was served at the Mohawk Club in Schenectady in the evening.

The meeting on March 11 was opened by Dr. Steinmetz, who outlined the various systems of power distribution. He also covered briefly but comprehensively the lightning protection problem as solved by the aluminum cell arrester. Prof. E. F. Graighton continued Dr. Steinmetz's presentation of the lightning protection problem, illustrating his talk with a number of experiments with high frequency electrostatic discharges.

Observed Anniversay.—The American Institute of Electrical Engineers, on the evening of March 12, celebrated the twenty-fifth anniversary of that organization with a dinner at the Hotel Astor, New York City. Louis A. Ferguson, president of the institute, served as toastmaster, and the speakers were President Jesse M. Smith, Past President Elihu Thomson, Past President Frank J. Sprague, and President Alexander C. Humphreys, of the Stevens Institute of Technology. Of the living past presidents T. Commerford Martin, Elihu Thomson, Frank J. Sprague, Francis B. Crocker, Charles F. Scott, Bion J. Arnold, John W. Lieb Jr., Schuyler S. Wheeler and Henry Gordon Stott were present at the reunion.

THE WORKS OF THE INDIANA STEEL CO.—III[1]

This Article Describes the Open Hearth Plant, the Soaking Pits and the Rail Mill of the Steel Corporation's Great Plant at Gary.

The progress of the Gary plant toward completion may be gaged by the fact that there are now in operation seven open-hearth furnaces and there have been rolled in the rail mill several thousand tons of rails. As has been stated in previous articles of this series, the complete open-hearth plant will consist of six separate buildings, four of which are being completed consecutively without delay. Of these four, two buildings, Nos. 3 and 4 are now complete, and steel is being erected on the third building, No. 1. Each building, of which the plan dimensions are 194 feet, 3 inches by 1189 feet, not including the gas producer house or the mixer annex, will contain 14 furnaces in single alignment, spaced 82 feet between centers. These furnaces are rated at 60 tons each, but they have sufficient hearth area and have actually been run to make from 80 to 90 tons at a heat. The capacity immediately planned is therefore 56 furnaces, producing approximately 13,500 tons of steel every 24 hours upon the assumption that three heats are taken off each day.

The Open Hearth Buildings.

The placing of each building at an angle of 35 degrees to the north and south line has been made familiar by the previous publication of the ground plan of the plant. It should be noted further that the buildings are arranged in pairs and laid out right and left hand. This is illustrated by the location of the gas producer house, that for open-hearth No. 4 being on the northwest side of No. 4 building and that for No. 3 being on the southeast side of No. 3 building. The same arrangement applies to the pouring and charging floors and the scheme of tracks. Each open-hearth building is built in two longitudinal bays, surmounted by a central monitor roof and supplemented by a lean-to on the gas producer side.

The pouring floor bay is 64 feet, 9 inches wide and is traversed by two 125-ton ladle cranes with 25-ton auxiliary hoists. The other bay in which are the furnaces and the charging floor is 83 feet, 6 inches wide and is served by 75-ton cranes. The lean-to is 45 feet wide. The pouring floor is at ground level. The charging floor is a steel platform 14 feet, 5 inches above the ground level. This platform also extends across the lean-to. There is on this platform, in front of the furnaces for the entire length of the building, a clear width of nearly 60 feet within the main bay and beyond the columns, and 45 feet in the lean-to. The charging floor proper is traversed longitudinally by one track immediately in front of the furnaces on which the scrap and cold metal charging boxes are brought in. The low-type charging machines travel on rails of 24 feet, 6 inches gage, laid down through the middle of the charging floor. On the opposite side of the charging floor from the furnaces is a track, near the columns, on which runs an electrically-operated ladle car. Instead of being carried all the way from the mixer to the furnace by a crane, a dangerous proceeding, the ladle containing the hot metal is carried on a ladle car from directly under the spout of the mixer to a point opposite the furnace to be charged. From there it is lifted across the charging floor to the furnace to be poured.

Three tracks traverse the lean-to and afford storage and side tracks for a variety of purposes. Four cross-overs connect them with the charging car track in front of the furnaces. Connection is made with the ground-level tracks at either end of the building by steel trestles. Scrap, pig iron, refractory materials, iron ore or any other material may thus be brought in from either end of the

[1]The preceding articles of this series were published in THE IRON TRADE REVIEW of Jan. 7, and Feb. 4, 1909.

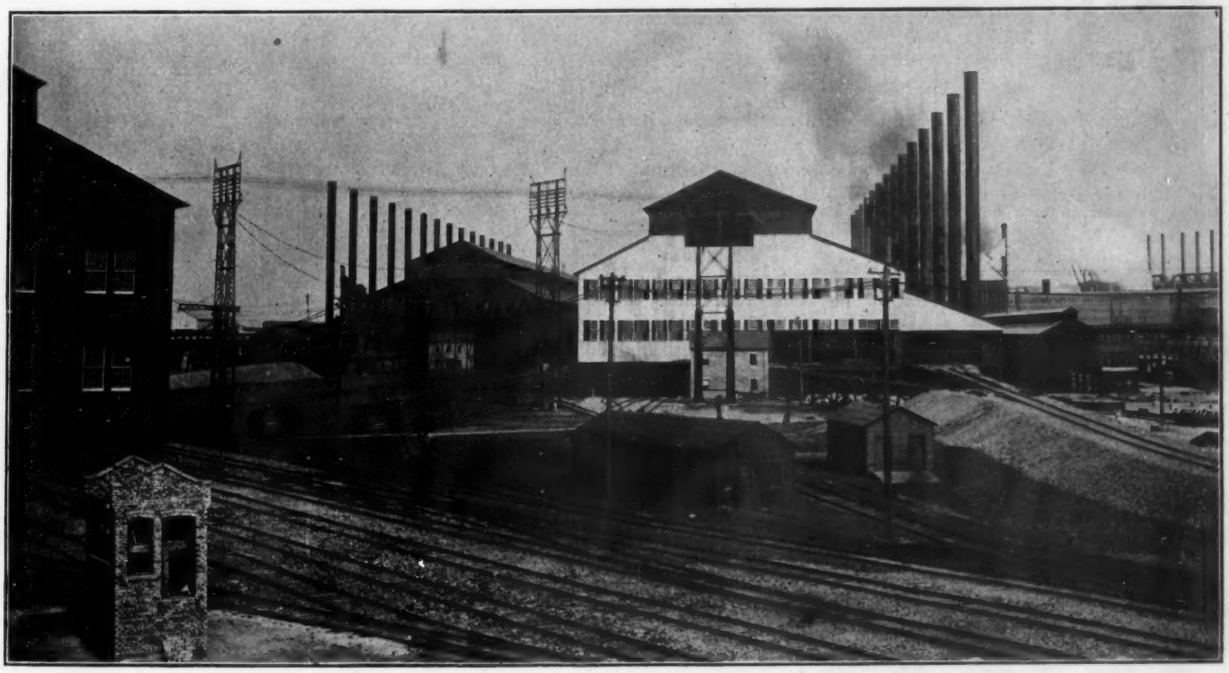


FIG. 1—OPEN HEARTH BUILDINGS NOS. 3 AND 4 LOOKING NORTHWARD.

In the foreground on the left a part of ingot stripper No. 2 is shown. The set of ladder tracks extending between the buildings provides a mold yard which is spanned by cranes. The grades and trestles which carry the tracks to the charging floor of the open hearth and to the gas producers are also shown. The open space in front of the furnace buildings will be used when necessary for ingot storage.

building. All tracks are standard gage and all tracks are built to carry the weight of standard rolling stock.

The pouring floor is traversed by three tracks. The central one is the through service track. The track nearest the furnaces is used for handling material immediately under the furnace spouts, such as slag boxes, slag, etc. The track near the outside wall is used for spotting the ingot molds for pouring the steel. Four pouring platforms are erected alongside of this track so that the distance through which the molten steel is required to be carried by the crane is reduced to a minimum. Cross-overs connect all three tracks at frequent intervals and between each pouring platform there is a run-out through the side of the building to a track which parallels the building. The completeness of the track facilities for serving the plant is apparent.

The Mixer Annexes.

The annex in which the mixers are mounted is located at the north end of each building. Each annex is a building 86 feet wide by 120 feet long. Two 300-ton mixers are installed, the one being auxiliary to the other. They are mounted centrally in the building with the center line of the mixers 35 feet 5 inches above the ground level. A 75-ton crane is installed to serve the mixers. This crane clears the crane serving the charging floor of the open-hearth building and may be run out over it for a short distance. Two stub end tracks enter the annex at one side on the ground level and on these the hot metal from the blast furnaces is brought in. The ladle is lifted by the crane and the metal is poured directly into the mixer. The two tracks permit of repairing the ladles on one of them before they are returned to the blast furnace.

At the opposite side of the annex, and under the opposite or pouring end of the mixer, the charging platform is continued out from the main building to carry the hot metal tracks under the mixer spout. The mixer is tilted by hydraulic means, and the metal is poured directly into the ladle on the hot metal car. Track scales are provided for weighing metal into the mixer and out of it. The outgoing metal must be weighed with particular accuracy, for at this plant the greater part of the recarburizing of the open hearth bath is done with hot metal from the mixer. With the pig iron from the blast furnaces running fairly uniform this method has operated very successfully.

The Open Hearth Furnaces.

With the exception of certain minor improvements, including a somewhat heavier construction than has been adopted previously and the general freedom or arrangement, the furnaces proper depart but little from designs which are already familiar. As in the other heavy structures of the Gary plant the open-hearth building is erected on a concrete monolithic slab on which are built the arched concrete foundations for the furnaces. This arched construction permits of free access to the regenerators beneath the charging floor from all sides, and also decreases the bulk of the foundation material.

The doors of the furnaces are operated by hydraulic pressure, the controlling levers being located opposite the furnaces in line with the building columns. The valve stems and handwheels for operating the reversing valves also project through the charging floor in the line of the columns so that both are removed from any possibility of interfering with traffic. On the pouring side every convenience is provided for the operator. The platform is continued on that side of the furnace so that one may pass continuously, and stairs leading down to the ground level are located at frequent intervals. The column on one side of the pouring spout have extra wide webs for the protection of the operator during pouring. Instead of having to throw by hand the lumps of ferro-manganese and ferro-silicon into the ladle, a permanent ferro-manganese chute is mounted so as to discharge the alloys directly into the ladle. The lever controlling the run of ferro-manganese is located far enough away on the platform to afford complete protection for the operator from the boiling metal.

The ladles used have a capacity of 80 tons. The ladle has a lip on one side so that the slag may run out as the

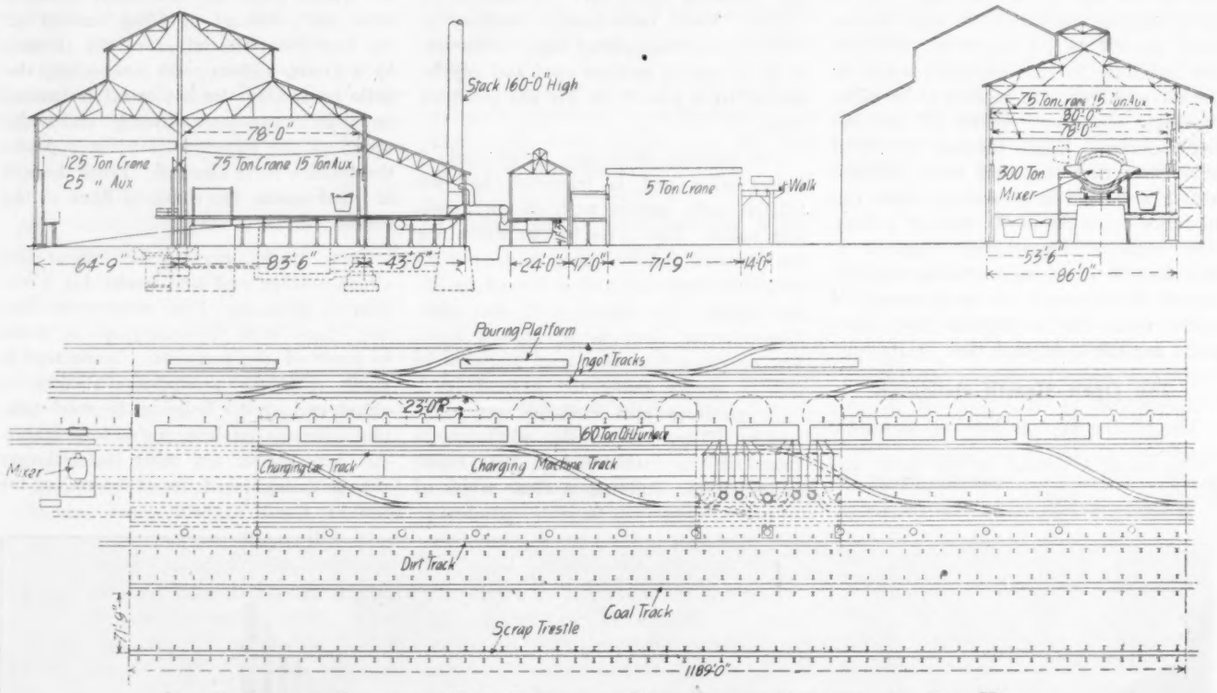


FIG. 2—GENERAL PLAN AND CROSS-SECTION OF OPEN HEARTH BUILDING AND GAS HOUSE.

Plan and section of the mixer annex is also shown. Two mixers are now installed in each building. There are 14 60-ton (rated capacity) furnaces in each building arranged 82 feet between centers.

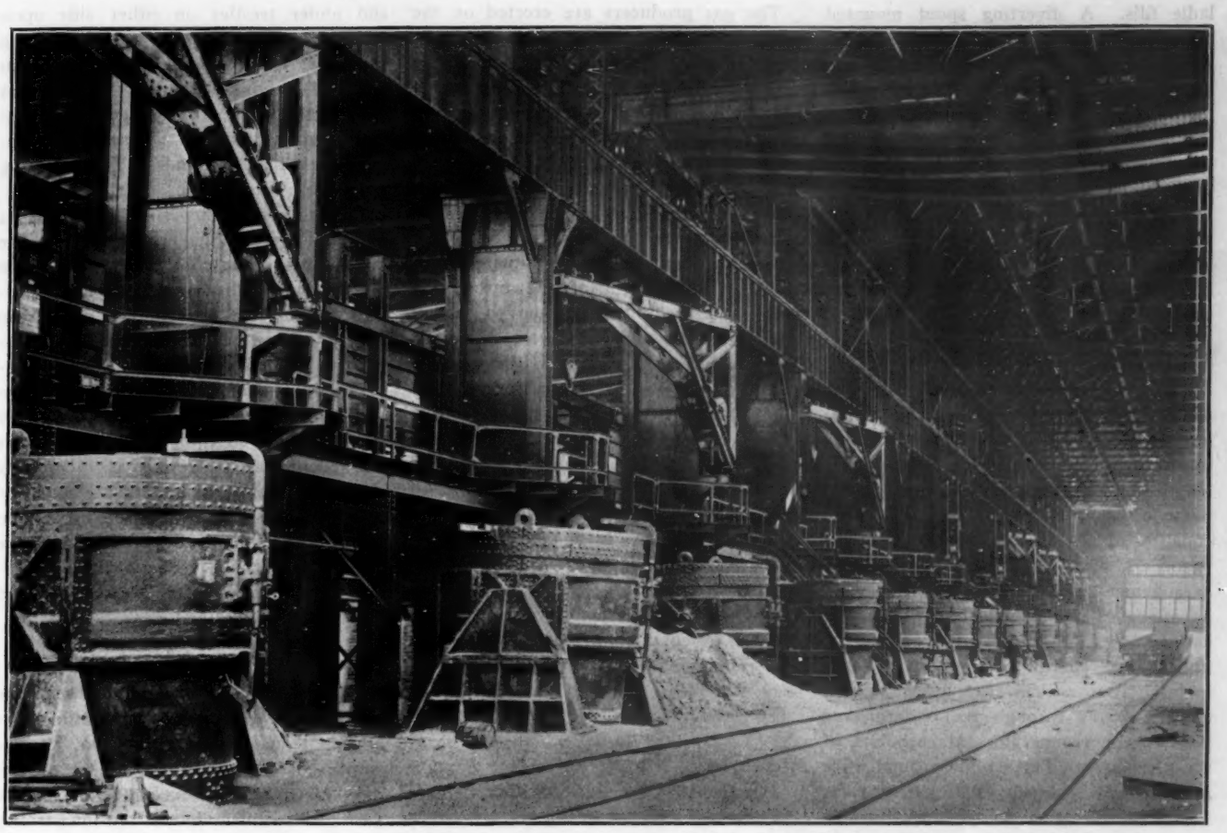


FIG. 3—POURING SIDE OF OPEN HEARTH NO. 4.

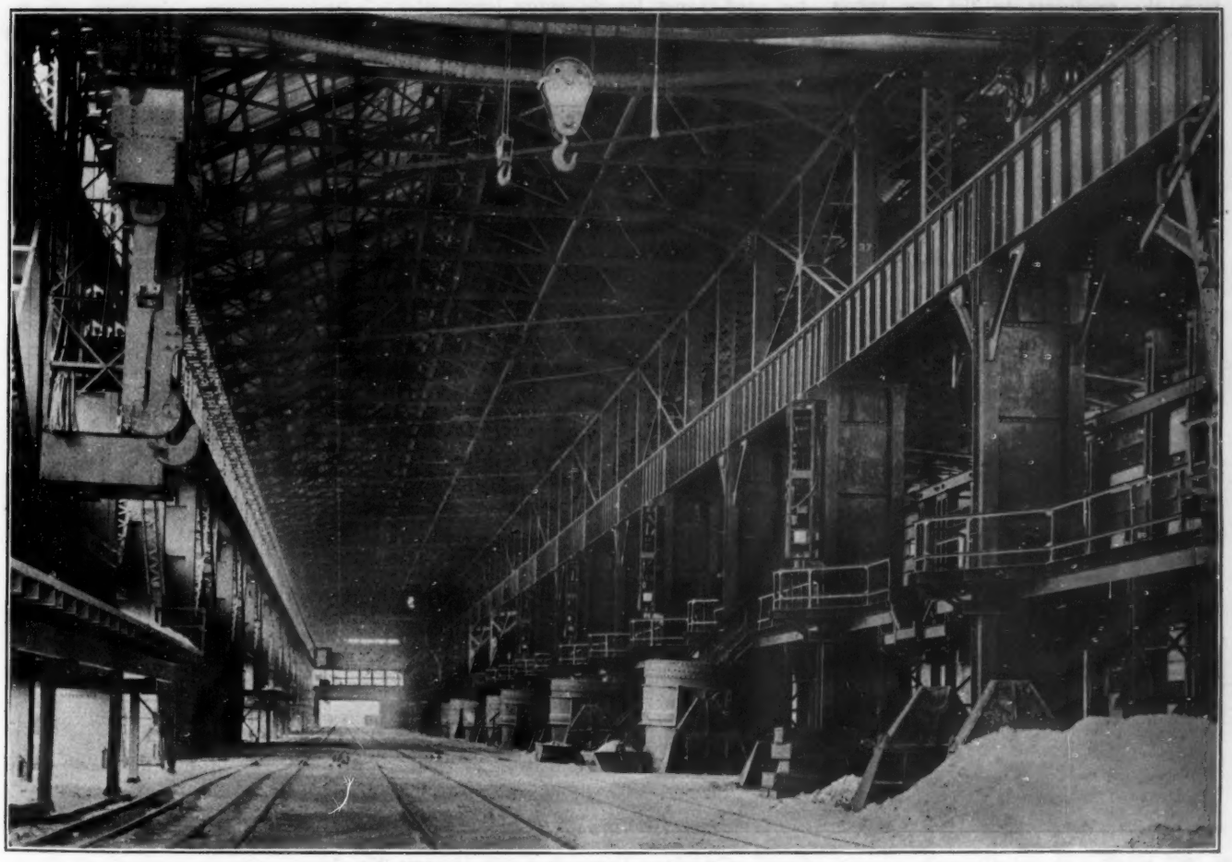


FIG. 4—POURING SIDE OF OPEN HEARTH NO. 3.

From these two views may be seen how buildings Nos. 3 and 4 are laid out on opposite hands.

ladle fills. A diverting spout mounted on a standard along side of the ladle-supporting brackets, discharges it into a cast iron slag box by means of which the slag may be easily removed. A further improvement which will be adopted in the open-hearths Nos. 1 and 2 is the substitution of electric for hydraulic power in the operation of the furnace charging doors. This may also be applied to the tipping of the mixer, but as yet this problem has not been worked out.

Gas Producers for the Open Hearth.

The gas producer installation for each set of 14 furnaces is located in a building 24 feet wide which parallels the open-hearth building for its entire length and is separated from it by a width of about 20 feet. The installation consists of 70 10-foot hand-poked gas producers arranged in one row. This arrangement provides for each furnace a battery of five producers. The gas is carried over to the furnace building under the charging floor in 54-inch mains, from which two branch mains carry the gas through the underground flues to the regenerators at each end of the furnace. This underground flue arrangement compels the gas to reverse its direction in passing through the valve. The reversing interval is 15 minutes. The total length of gas flues from the producers to the gas valves installed for two open hearths is a little more than a mile and a half.

The gas producers are erected on the ground level and the charging platform is at a height of 11 feet, 3 inches above ground level. Coal for charging the gas producers is brought up on a trestle which parallels the gas house at a height of 24 feet, 3 inches above ground. From standard bottom hopper coal cars, the coal is discharged into two bins leading to two jaw crushers. These crusher plants are situated one-third of the length of the installation apart and break the coal up so that it will pass through a two-inch mesh. Continuous elevators carry the crushed coal up into two 600-ton storage bins. The coal is discharged through bottom valves directly into four larry cranes which traverse the charging floor and spout the coal directly into the top of the gas producers. These cranes also weigh the coal. It is estimated that each installation of 70 producers will require 800 tons of coal every 24 hours, from which will be developed about 100,000,000 cubic feet of gas. The ashes are removed in cars spotted in a subway between the gas producers and open-hearth.

Yard Equipment.

Parallel to the gas producer house and immediately adoinjing is the stock yard for the open hearths. A width of 71 feet 9 inches is spanned by five-ton yard cranes for the entire length of the open-hearth building, or nearly 1,200 feet. Four tracks traverse this yard, and under trestles on either side upon which the materials are brought to the yard, are stored scrap, pig iron, iron ore and ferro-manganese. The cranes serving the yard are equipped with lifting magnets having a maximum capacity of 10,000 pounds. The charging boxes are filled here.

Alongside of the stock yard is a building for grinding refractories. The dolomite is brought to the building on a trestle and is discharged through openings in the side into suitable vessels in which it may be handled to the crushers by the five-ton crane which traverses the building. There are installed a gyratory crusher and four grinding pans so equipped with elevators and connecting conveyors as to entirely eliminate manual handling. From the grinding pans there is a conveyor upon which the dolomite is carried to the kilns for burning. Four kilns are installed. Ground level tracks also run through the building.

Skull Cracker and Ingot Strippers.

The space 100 feet wide between the two open-hearth buildings is utilized as an ingot mold yard, and also for the storage of ingots. A double set of ladder tracks is laid out therein and the yard is spanned by a ten-ton trolley crane, the runway for which is carried in part by the open hearth columns and in part by a separate structure. At the north end of the mold yard a skull cracker has been erected. The steel

FIG. 5—CHARGING FLOOR IN OPEN HEARTH NO. 3.

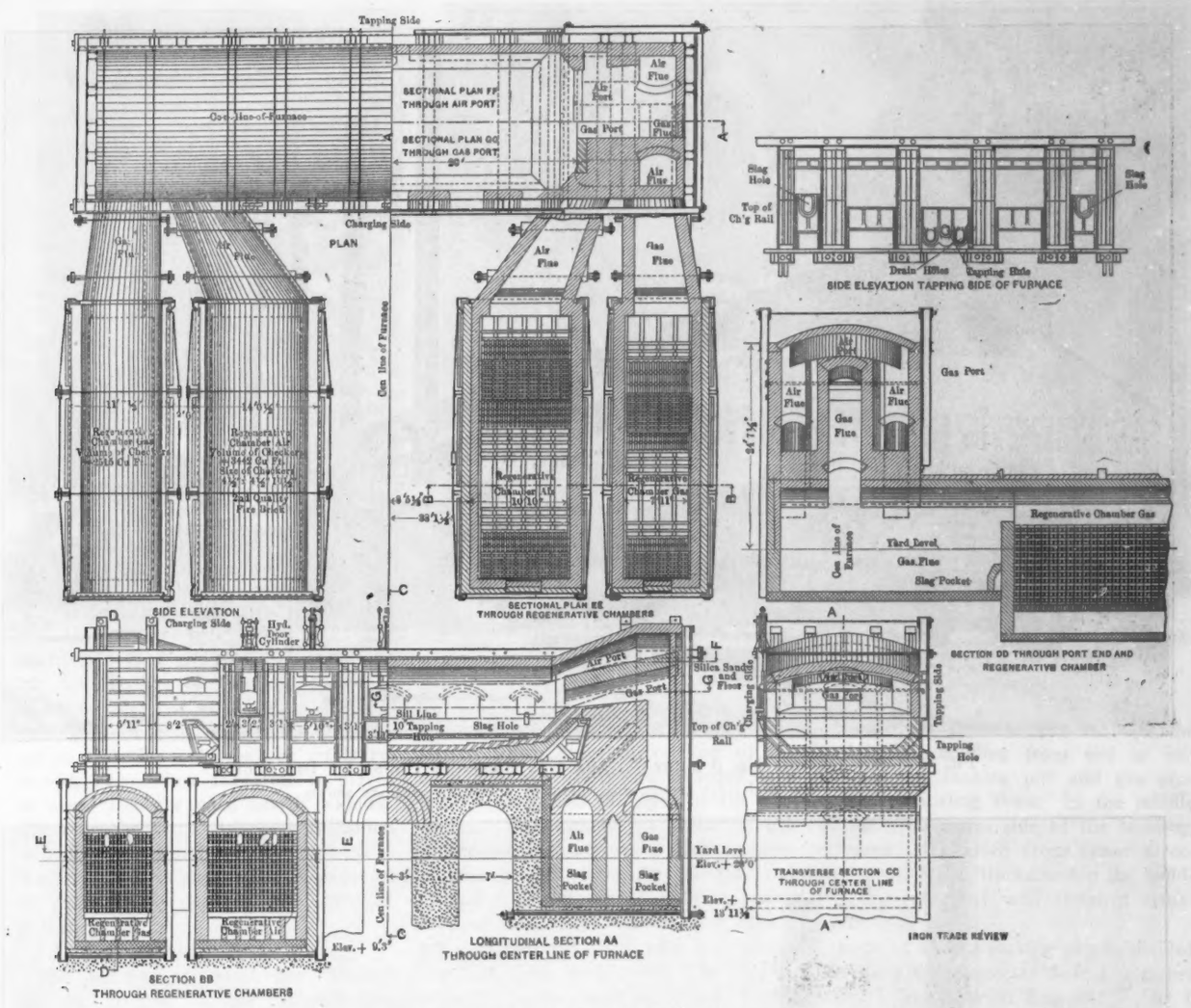


FIG. 6—GENERAL DRAWING AND CROSS-SECTION OF THE OPEN HEARTH FURNACES INSTALLED AT GARY.
Except for somewhat heavier construction and the open arch design of its substructure it conforms to previous installations.

frame covers an area about 40 feet wide by 200 feet long and carries two 40-ton cranes. Immediately inside and paralleling the supporting columns on each side, a track runs through the breaking ground. To make a substantial footing an excavation was made under the skull cracker and this was filled with molten slag from the blast furnaces. The surface was leveled off with cinder and then overlaid with steel blooms placed side by side.

Two ingot strippers are now erected and in service. They are open steel structures approximately 50 feet square and they span four tracks. The arrangement of the tracks and connections provides the utmost freedom in handling the ingots. The strippers are located as near to the soaking pits as possible so that a minimum of heat is lost after the ingot is removed from the mold. The distance from the open-hearth to the ingot stripped is also sufficient to permit the reactions within the

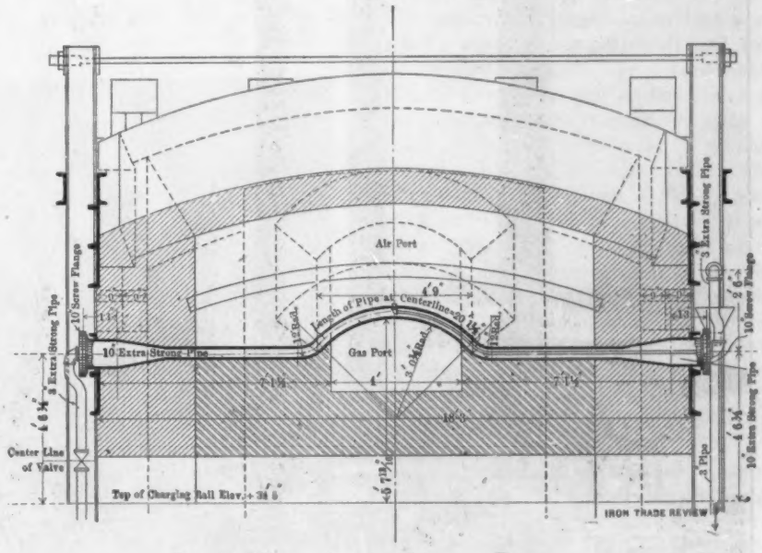

Air Port
Length of Pipe at Centerline of Port
Gas Port
10 Extra Strong Pipe
3 Extra Strong Pipe
10" Screw Flange
Center Line of Valve
Top of Charging Rail Elev. + 36'0"
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FIG. 7—WATER COOLED FURNACE PORT.
The cooling pipe is 10 inches diameter flattened. From the top point of the bend an air connection has been put in to carry off the air which otherwise would collect and cause the pipe to burn out.

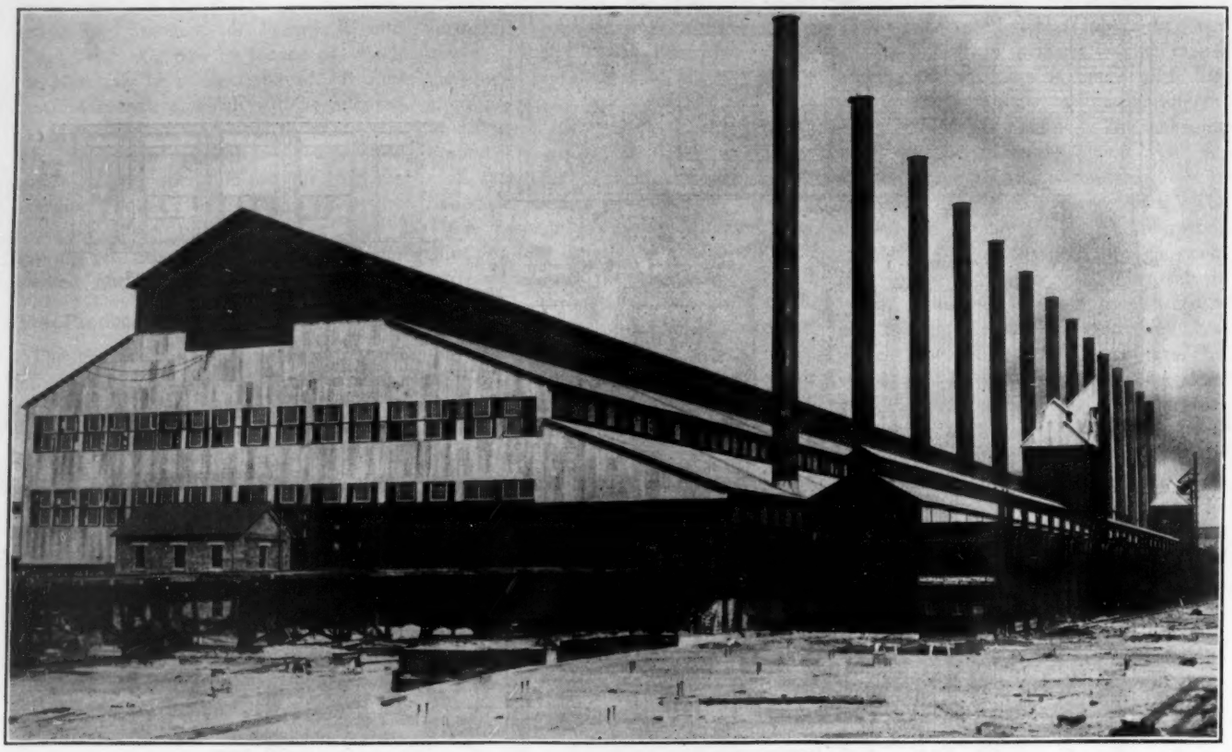


FIG. 8—OPEN HEARTH NO. 3 SHOWING THE GAS PRODUCER HOUSE ON THE RIGHT.
The coal track trestle, coal elevators and scrap yard are shown.

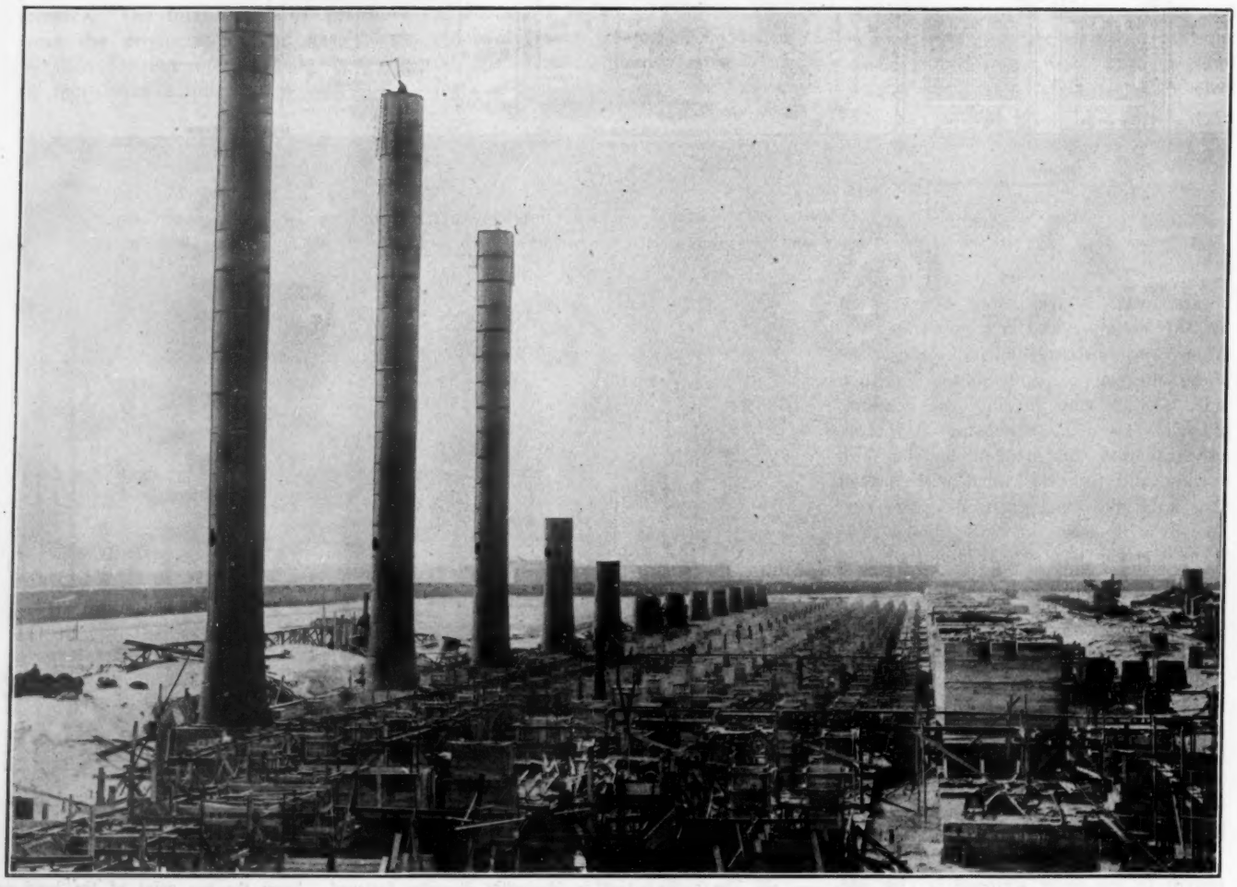


FIG. 9—FOUNDATIONS FOR OPEN-HEARTH NO. 1 UPON WHICH THE ERECTION OF STEEL IS JUST BEING STARTED.

FIG. 10—BIRD'S-EYE VIEW SHOWING THE LINE OF 70 GAS PRODUCERS IN THE COURSE OF ERECTION.

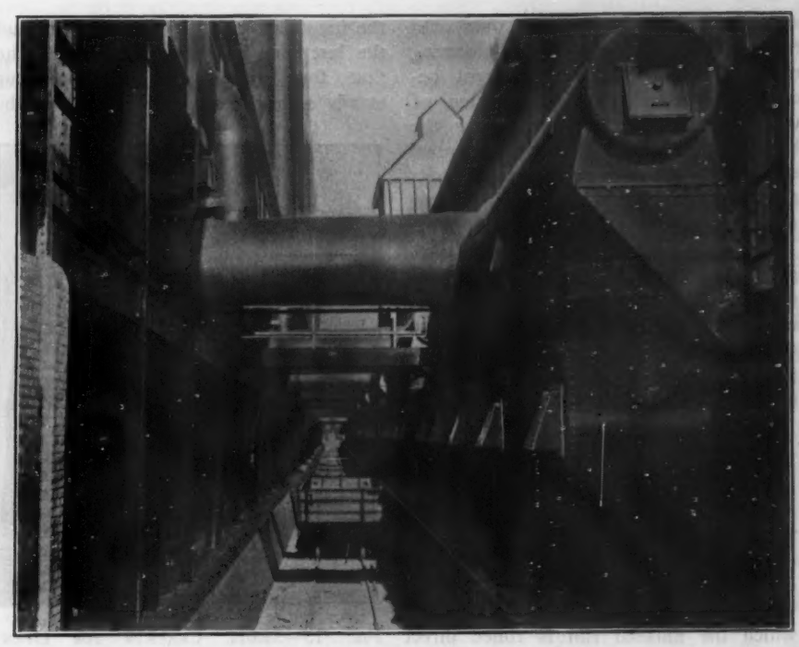


FIG. 12—VIEW BETWEEN THE GAS PRODUCERS AND THE OPEN-HEARTH BUILDING, SHOWING THE GAS FLUE CONNECTIONS AND THE TUNNEL IN WHICH ASHES ARE REMOVED.

steel to be completed and the ingot to set so that the mold may be freely removed, even when the steel is moved at once from the open hearth building. There are in No. 1 stripper two 200-ton stripping cranes and one in No. 2. The use of standard gage track is expected to prevent any upsetting of ingots in transit.

Soaking Pits.

The building in which are installed the soaking pits for the rail mill also contains the soaking pits for the billet mill. The portion of the building in which are the 12 soaking pits for the rail mill is 84 feet wide by 600 feet long. The gas producers supplying the gas for heating the pits are located in a lean-to which opens directly off of the main building. They are arranged in a manner similar to the open hearth producers. The soaking pit producers are of the mechanically-poked Hughes type, as distinguished from the Morgan, and instead of a charging larry distributing the coal to each producer the producers are arranged in pairs with a separate coal bin above each pair. The coal is brought to the building on a trestle which is continued over to open hearth No. 4. There are 12 producers in all for the rail mill soaking pits, one for each pit.

Two ingot tracks, laid on steel ties embedded in concrete, run through the soaking pit building from end to end between the soaking pits and gas producers paralleling them. In the middle of the open-hearth side of the building, entrance is provided from either direction and the two tracks within the building are connected with frequent cross-overs.

Each of the 12 soaking pits is divided into four compartments 5 feet 6 inches wide, 5 feet 9 inches long and 7 feet 6 inches deep. Each compartment will accommodate four ingots so that the aggregate capacity of the soaking pits is 192 ingots or approximately 384 tons. The battery is arranged in sections comprising four pit compartments and two regenerator sets. The regenerator checker-work is located on both sides of the pits and each section occupies a space 36 feet 2 inches wide by 48 feet long by 19 feet 6 inches high. The brick-work is carried on a steel framework and is built up on a concrete foundation from a level 12 feet below ground. This brings the top of the pits approximately 7 feet 6 inches above the track level. The pit covers are operated by hydraulic power. The controllers are mounted on platforms which also serve as bridges over the ingot tracks, connecting the gas producer lean-to with the pits.

On the opposite side of the soaking pits and paralleling them is the only narrow gage track in the entire steel plant. Upon this travels an electrically-operated ingot car. It has a body especially designed to receive the ingot

FIG. 11—INTERIOR OF THE GAS HOUSE FOR OPEN-HEARTH NO. 4, SHOWING THE CHARGING FLOOR.

and arranged to tip the ingot over onto the roll table leading to the blooming mill. The handling of the ingot becomes complete with the operation of the 8-ton ingot crane which spans the building. The ingot is lifted on entering from the ingot tracks into the pits and from the pits onto the ingot car which carries it to the blooming mill. The ingot car is controlled from a pulpit at the end of the rail mill which overlooks the track. It stops automatically in front of the rail mill table and the same operator controlling the approach table to the 42-inch blooming mill sends it through the first pass.

The Rail Mill.

The Gary rail mill, with its capacity for rolling 4,000 tons of finished rails every 24 hours, is the largest in the world. Its 6,000-horsepower mill driving motors are the largest alternating-current motors ever built for mill service. It is the only motor-driven mill in which the finished rail is rolled direct from the ingot without reheating. The plant was designed to have the maximum of operating speed, the greatest reliability and simplicity, and as complete a system of automatic and mechanical control as possible.

The ingot delivered to the approach rolls from the soaking pits weighs a little more than 8,000 pounds and is in cross section 20 x 24 inches. The conversion from the ingot into the finished rail is made in 18 passes, of which the first nine are employed in breaking down the ingot into an 8 x 8-inch bloom, and the last nine in shaping the rail. The first four passes are made in four stands of rolls arranged in tandem, the

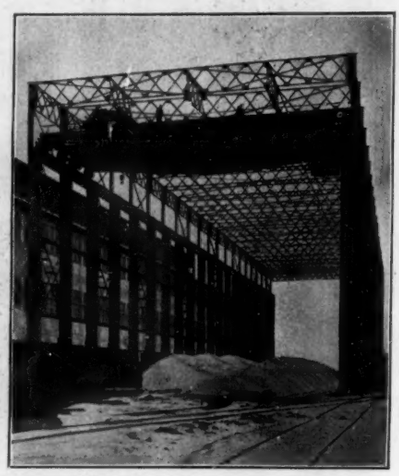


FIG. 13—SKULL CRACKER FOR OPEN-HEARTH NOS. 3 AND 4.

first two of these being 42-inch mills. Between each of these mills and following the fourth the bloom is given a 90-degree turn. Passes Nos. 5, 6, 7, 8 and 9, with a 90-degree turn between each are given in a three-high 40-inch blooming mill served by lifting tables. From this mill, the piece runs to a 10 x 10-inch horizontal bloom shear where it is cut into two parts and the crop ends disposed of by a crop conveyor.

The Rail Mill Proper.

Beyond this shear is the rail mill proper. The first three passes Nos. 10, 11 and 12 are given in a 28 x 60-inch, three-high roughing mill which is served by tilting tables. The remaining passes are all made, each in a separate set of rolls in 28 x 40-inch two-high mills. These passes, consecutively, are forming, dummy, first edging, second edging, leading and finishing. Between the roughing and forming set, and between the forming and dummy set the piece is given a 90-degree turn. Following the dummy set, the piece is turned 90 degrees and is passed, via a chain transfer table, to the first edging approach rolls. Another transfer table handles the piece from the second edging to the leading set, whence it follows on through the finishing set to the hot saws. These are five in number, cutting the rail into four lengths. From the saws the rails are passed through the cambering machine, and cooled, straightened and punched.

The Rolling Operations.

The piece is edged after every pass in the blooming mills. The first four edgings are accomplished by the use of collared rollers on the tables which turn the piece up as it passes over them, thus avoiding the necessity of stopping the piece to handle it. After the fifth and seventh passes on the three-high blooming mill, the turning and shifting of the piece is accomplished in one

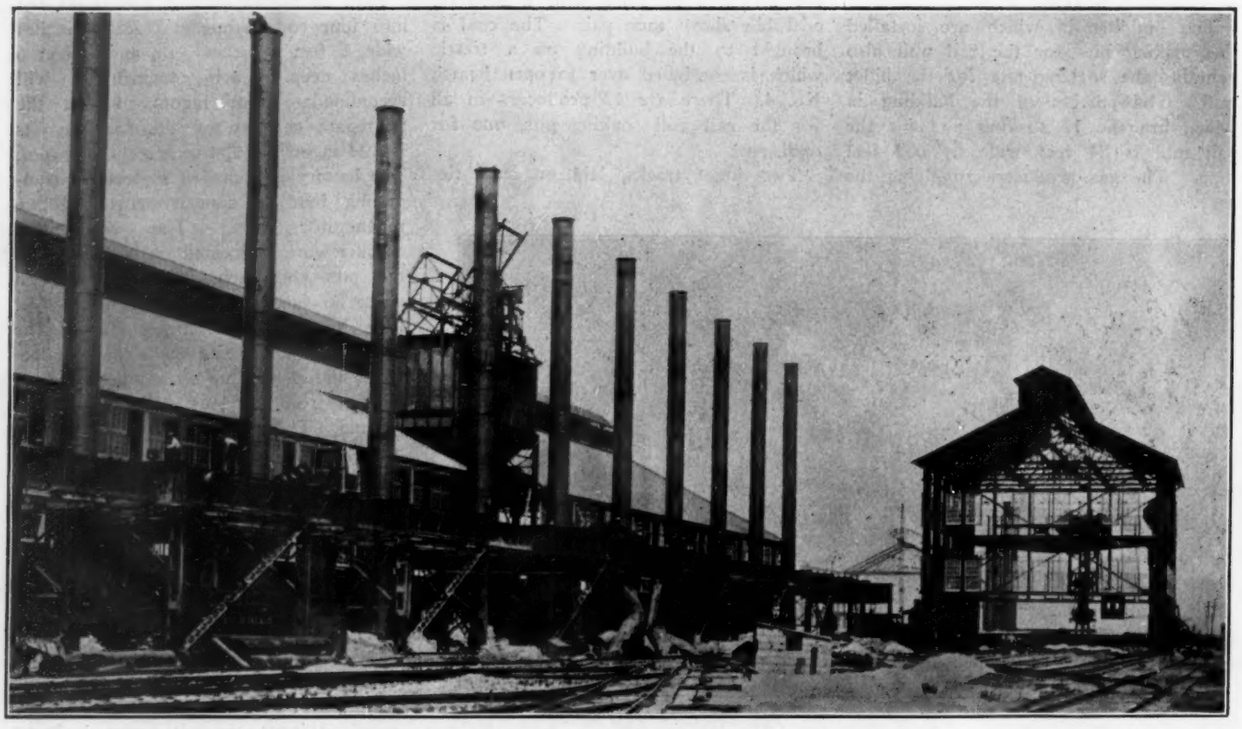


FIG. 14—INGOT STRIPPER BUILDING NO. 2, WHICH IS NOW SERVING OPEN-HEARTH NO. 4.

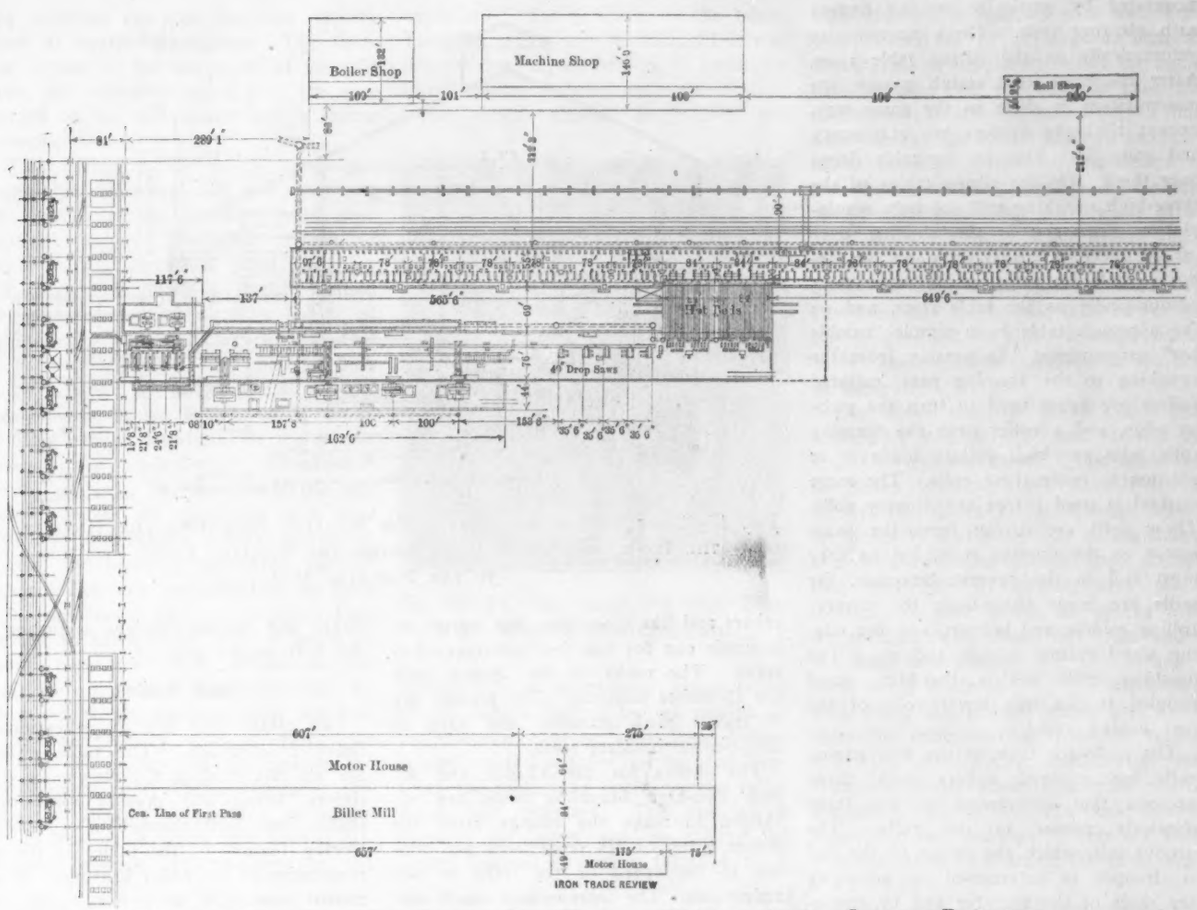


FIG. 15—PLAN OF RAIL MILL, SOAKING PITS, FINISHING DEPARTMENT AND SHIPPING PLATFORMS.

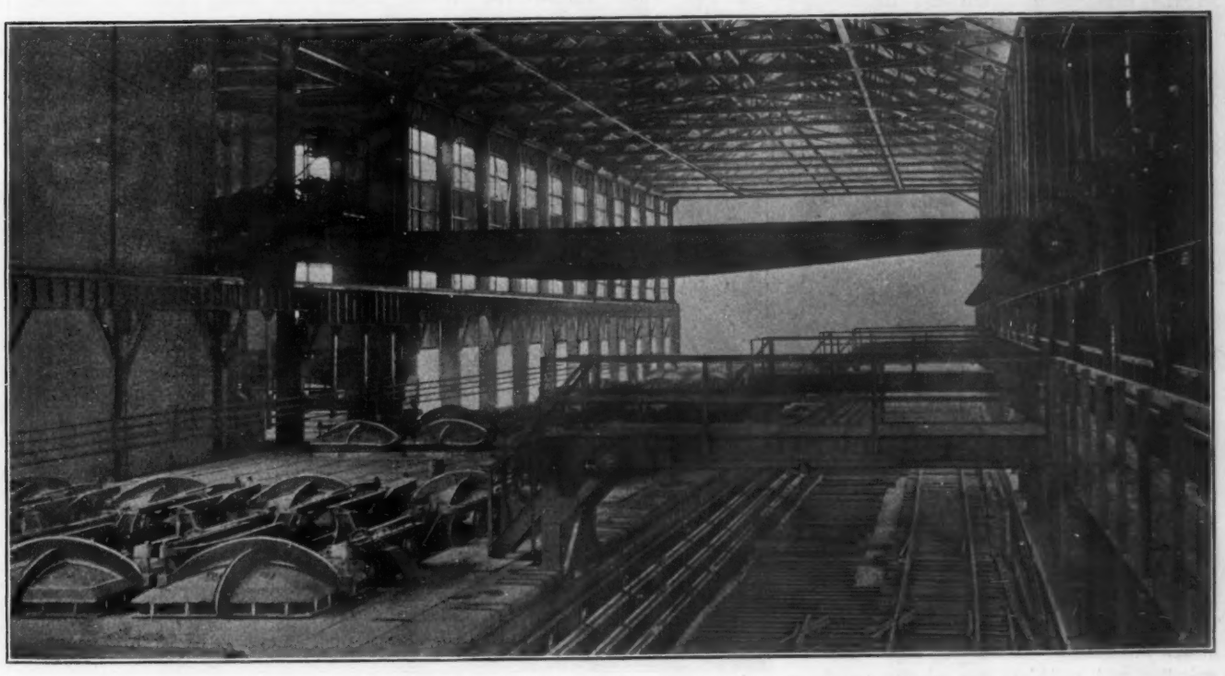


FIG. 16—INTERIOR OF SOAKING PIT BUILDING FOR THE RAIL MILL.
The ingot crane shown is spotted about in front of the opening into the rail mill.

movement by vertically moving fingers with slanting tops. These fingers rise automatically as the lifting table rises. After the sixth and eighth passes, the manipulation is done in the same way, except that the fingers are stationary and come into play as the table drops over them. On the tilting tables of the three-high roughing mill the only manipulation necessary is the shifting over of the piece. This is done on the delivery table by arms which move over automatically as the table rises, and on the approach table by a simple "tumble bar" arrangement. In passing from the roughing to the forming pass, collared rollers are again used to turn the piece on edge, and a roller near the forming rolls with two-high collars holds it in position to enter these rolls. The same method is used before the dummy rolls. These rolls are driven from the same motor as the dummy rolls, but as they must roll in the reverse direction, the mills are made three-high, the dummy rolling middle and bottom, and the edging stand rolling middle and top. The finishing rolls are a two-high stand coupled to the two lower rolls of the first edging stand.

The approach table at the first edging rolls has grooved rollers with three grooves that correspond to the three duplicate passes in the rolls. The groove into which the flange of the rail is dropped is determined by adjusting the skids of the transfer and by changing the position of the mechanism which causes the dogs on the chain to release the rail. The table between the first and second edging rolls has grooves similar to the previous one but the delivery table of these rolls has plain rollers.

Design of the Mills.

The mills themselves are all of very heavy design, the two-high blooming mill housings weighing about 55,000 pounds each. The housings are all of the open top type to facilitate roll-changing. The necks of the 40-inch and 42-inch blooming mill rolls are 22 inches diameter. The pinions are 40-inches pitch diameter, machine molded, and have 14 22½-degree, staggered involute teeth, carried in bearings of the one piece type. The pinion housings are of cast iron and are so made that the two housings of a stand, together with their single cap and the bearings, form a closed case in which the pinions run. This case protects the pinions from dirt, and affords a means of thorough lubrication. The only openings in the pinion case, as we may call them, are six small doors, two on each side and two in the cap. These are closed by covers which are hinged on the housings. The spindles and wabblers are of the usual four pod type. The 28-inch mill housings are proportioned similarly to the

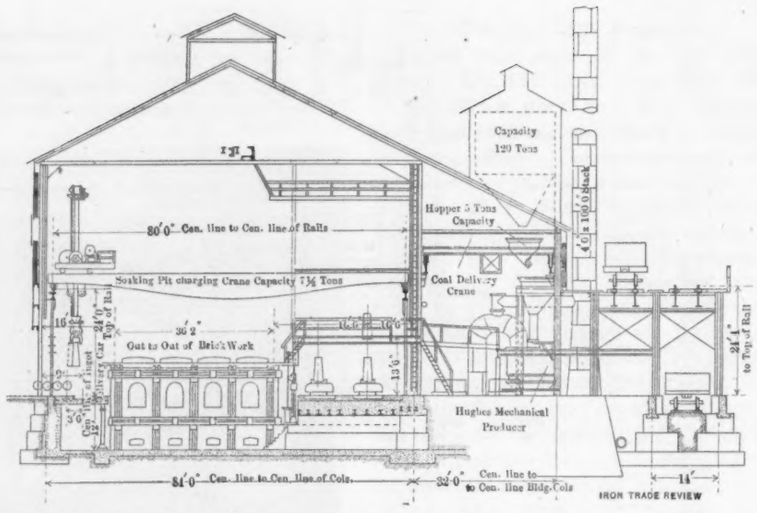

Capacity 120 Tons
Hopper 5 Tons Capacity
80'0" Cen. line to Cen. line of Rails
Soaking Pit charging Crane Capacity 7½ Tons
Coal Delivery Crane
Out to Out of Brick Work
Hughes Mechanical Producer
84'0" Cen. line to Cen. line of Cols.
32'0" Cen. line to Cen. line Bldg. Cols
14'
IRON TRADE REVIEW

FIG. 17—CROSS SECTION OF SOAKING PIT BUILDING INDICATING THE HANDLING OF THE INGOT FROM THE TIME IT ENTERS THE BUILDING UNTIL DELIVERED TO THE BLOOMING MILL.

others and like them have the feature of a single cap for the two housings of a stand. The necks of the 28-inch rolls are 16 inches diameter. The pinions are 27 inches pitch diameter and have 14 22½-degree involute teeth.

The drives for the 42-inch and 40-inch two-high blooming mills are arranged to make the change from the motor speed of 214 revolutions per minute to the speed of the mills in two reductions. The intermediate shaft carries two pinions cast in one piece which engage the two gears to which the mills are coupled. These gears are over 18 feet diameter and are machine molded. The girders which support the drives are all bolted together, thus making practically one bed for both drives. The journals on which the large gears are mounted are 24 inches diameter, and their bearings are made with quarter boxes and take-up wedges according to the best engine practice.

Mill Tables.

The tables also are of exceptionally heavy construction. The table girders are all cast steel, and hollow cast steel rollers, bored and pressed onto their shafts, are used throughout. A noteworthy feature of the tables is the arrangement of the roller bearings. These consist essentially of a heavy cast iron bushing with a machine-molded spherical part on its center, this sphere fitting into a bored spherical seat in the cap and girder, thus making a ball-and-socket joint which allows the bearing to turn in any direction to line itself up with the roller shaft. A dowel pin driven into the girder prevents the bushing from turning. A split bearing is used on the miter side and a solid bear-

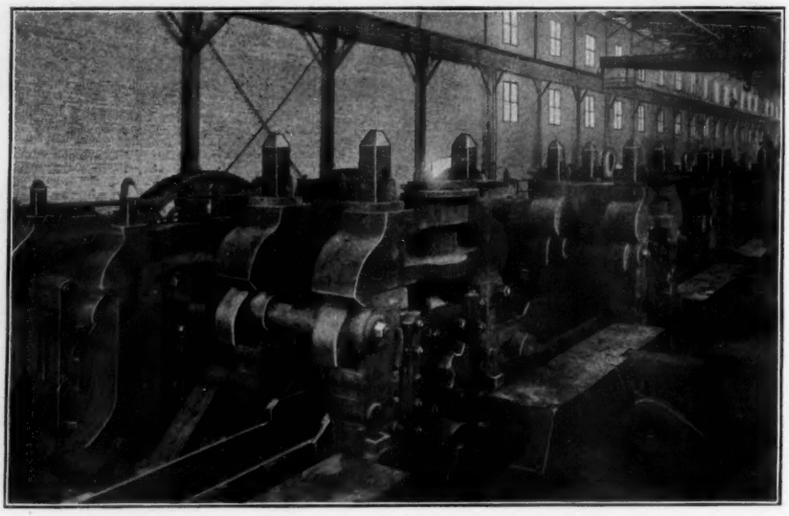


FIG. 18—TWO-HIGH 42-INCH AND 40-INCH TANDEM BLOOMING MILLS TO WHICH INGOTS ARE DELIVERED DIRECT FROM THE SOAKING PITS.

ing opposite, but split bearings may be used as spares throughout. The driving motors of the tables are of the mill type, and wherever practicable are supported on the side shafts and a spring suspension.

The lifting tables which serve the three-high blooming mill are deserving of special notice on account of their unusual design. The great weight of these tables, the lifted parts weighing 290,000 pounds, made a special method of balancing necessary. The inertia of an ordinary weight balance is so great as to seriously interfere with the high speed at which the tables are to operate. A simple hydraulic balance being found to have similar drawbacks to the weight balance, the air-hydraulic system was finally evolved. In this system the balance cylinders are connected to a tank with no intermediate valves except, of course, the ordinary gate type shut-off valves. The tank and cylinders are filled with compressed air at a pressure high enough to balance the table as much as found necessary. The volume of the tank can be varied by introducing oil or water, which, however, does not flow into the cylinders, thus changing the ratio of the volume of the tank to the displacement of the balance-cylinder pistons and making it possible to secure, within reasonable limits, any desired difference between the pressure at the upper and lower positions of the tables. Thus the tables may be balanced less at the top than at the bottom, to assist the lifting motor in handling them.

As stated above, the tables are

FIG. 19—DRIVING GEARS FOR THE TWO-HIGH 40-INCH BLOOMING MILL.

equipped with automatic manipulating devices which operate by the motion of the tables so that no controlling devices beyond those used for raising and lowering the tables and operating the roller drives are necessary. The link which operates the levers used in raising the fingers instead of being fastened to a rigid support, is fastened to a weight so proportioned as to be large enough to operate the manipulator, but at the same time to rise with the table in case the mechanism should become caught, thus avoiding damage to the table or manipulator. Another feature of the design is the great size of all pins and bearings, the idea being to keep the bearing pressures below 300 pounds per square inch, thus reducing the wear to a negligable quantity. The large pins are made of cast steel and are hollow, both to reduce the weight and to allow through lubrication, the oil being contained in cavities in the pins.

The tables are lifted by a crank and connecting rod arrangement, driven by a 250-horsepower motor. The speed of the tables is about three seconds for a stroke, the tables rising through about 42 inches in that time. The tilting tables are designed along similar lines, except that they are, of course, very much lighter. In both tables, all of the lifting mechanism is placed out from under the table in a separate pit, this arrangement being made to keep the machinery well above the ground water and away from the scale coming from the tables.

Placing the lifting mechanism out from the tables made long rock shafts necessary, which in turn necessitated more than two bearings. There are four bearings used, two under the table sup-

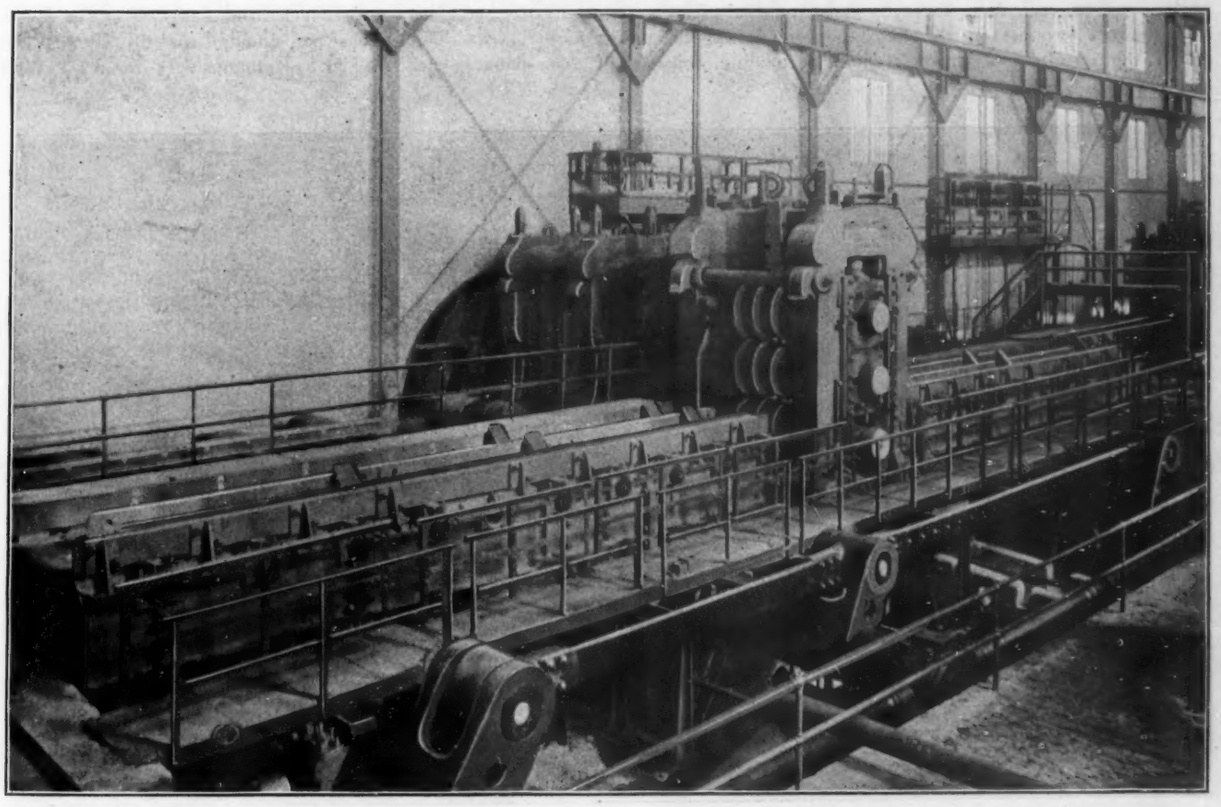


FIG. 20—THREE-HIGH 40-INCH BLOOMING MILL AND THE LIFTING TABLES WHICH SERVE IT.
This stand provides for five passes of the bloom.

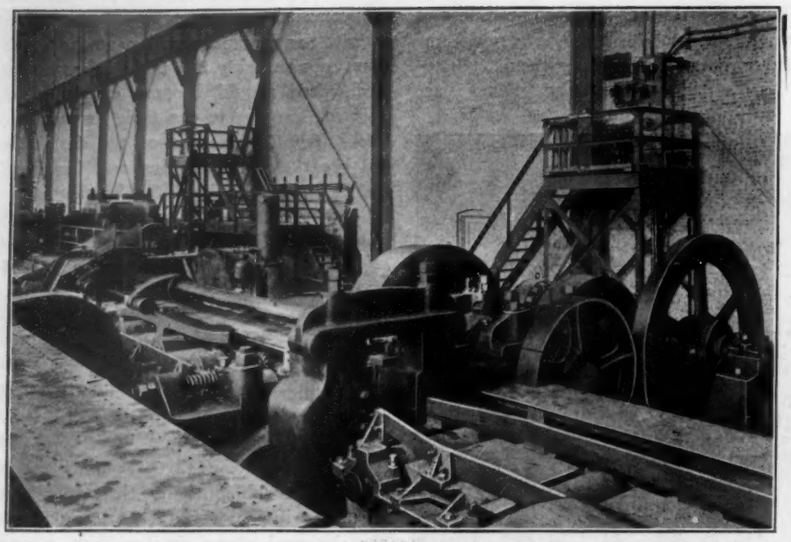


FIG. 21—HORIZONTAL BLOOM SHEAR BETWEEN THE THREE-HIGH 40-INCH BLOOMING MILL AND THE 28-INCH ROUGHING SET. THE SHEARING GAGES ARE ALSO SHOWN.

porting the weight, and two outside taking the side pull of the lifting mechanism. In order to overcome the difficulty to absolute alignment between the four bearings, sliding plate couplings were introduced between the two pairs. These couplings consist of two grooved flanges keyed and shrunk onto the shafts and a central disc with two tongues at right angles, one on each face, these tongues engaging the grooves in the flanges,—giving the effect of a universal joint. All parts of these tables are so made as to allow adjustment for wear.

Bloom Shear and Hot Saws.

The horizontal bloom shear mill has capacity of 10 x 10 inches and a speed of 12 cuts per minute. It is driven by a 75-horsepower, 2000-volt, alternating-current motor, and is controlled by an electrically-operated clutch. Its only unusual feature is a flexible coupling connecting the motor to the shear. This coupling consists of two flanges each carrying on its face the same number of regularly spaced pins parallel to the shaft. A heavy leather belt, with its ends laced together, is woven in and out between the pins and transmits the motion.

The saws which cut the rail into lengths are of the drop type and are 42 inches diameter. They are driven by 40-horsepower, 2000-volt, alternating-current motors, and make about 1400 revolutions per minute. The saws are brought down to the rail by crank and pitman arrangements, all five saws being geared to the same shaft, thus making their movement simultaneous. The arbors are of nickel steel 4½ inches diameter, and run in water cooled, ring-oiling bearings.

The Electric Drives for the Rail Mill.

In the electric driving of the mills and tables are embraced very much that is new and interesting. The main rolls of the mill are driven by six induction motors, having a combined capacity of 24,000 horsepower, and comprising two 2,000-horsepower motors running at 214 revolutions per minute, one 2,000-horsepower motor running at 68 revolutions per minute, one 6,000-horsepower motor running at 88 revolutions per minute, one 6,000-horsepower motor running at 83 revolutions per minute, and one 6,000-horsepower motor running at 75 revolutions per minute. The first two motors drive the 42 and 40-inch blooming mills, the 42-inch rolls operating at six revolutions per minute, and the 40-inch rolls at ten revolutions per minute. While

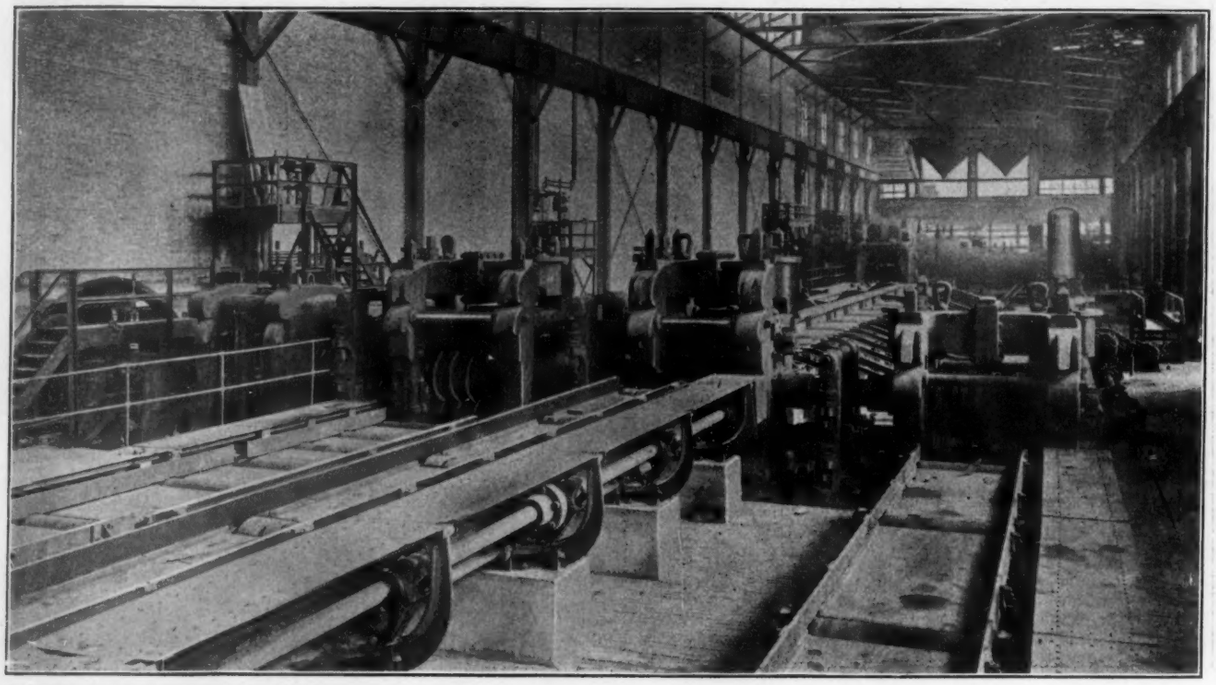


FIG. 22—LOOKING TOWARD THE SOAKING PITS AND SHOWING THE 28-INCH THREE-HIGH ROUGHING TRAIN IN THE FOREGROUND ON THE LEFT.

The other stands in this view are finishing trains and like all of the mills following the roughing set are two high 28-inch mills.

FIG. 23—LOOKING FROM THE SOAKING PITS INTO THE RAIL MILL, SHOWING THE ENTIRE MILL, EXCEPT THE TWO-HIGH BLOOMING MILLS.

In the immediate foreground is the lifting mechanism and hydraulic counterbalance especially devised to handle easily the great weight of lifting tables for the three high 40-inch blooming mill. The transfer table to the finishing train is also shown.

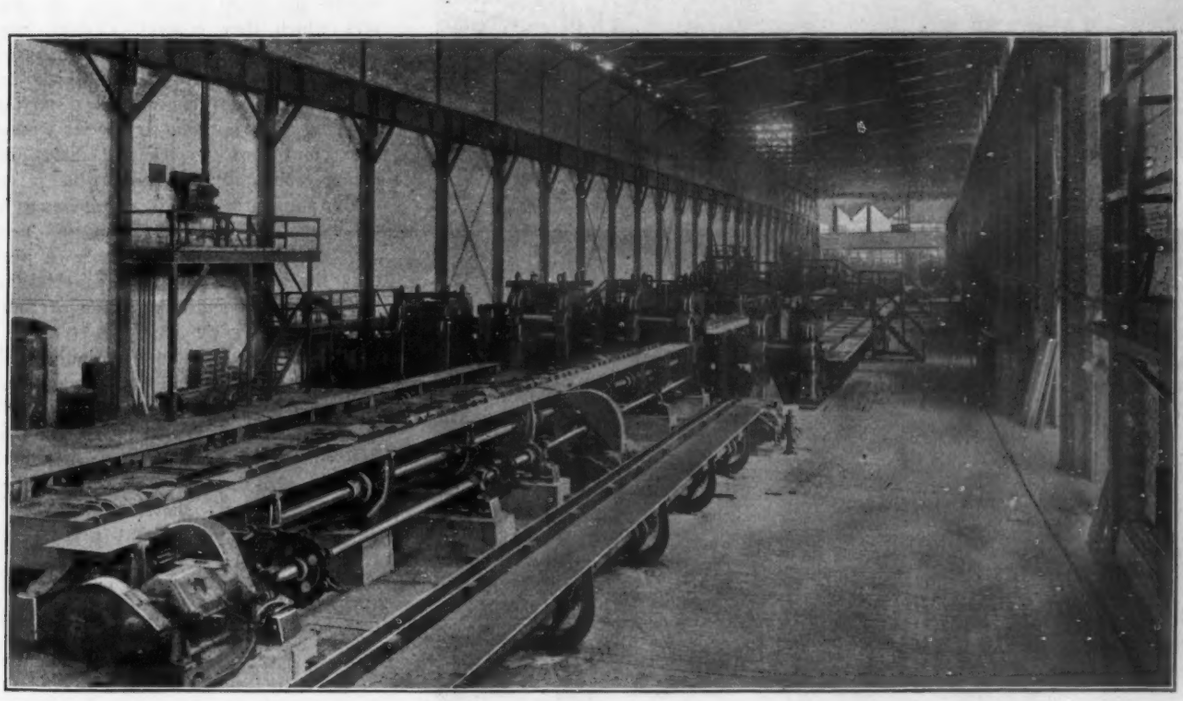


FIG. 24—THE 28-INCH FINISHING TRAIN.

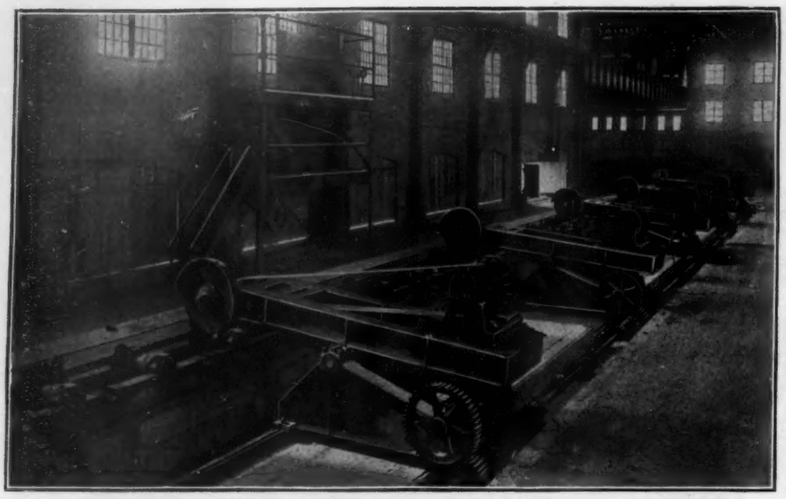


FIG. 25—HOT SAWS AND SAW RUN TO THE HOT BEDS IN THE RAIL MILL.

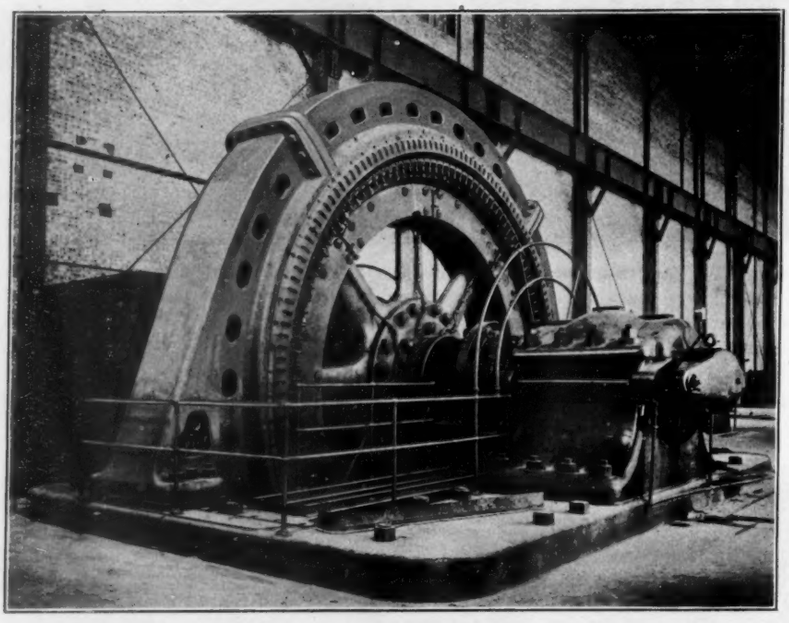


FIG. 26—ONE OF THE 6,000-HORSEPOWER DRIVING MOTORS FOR THE RAIL MILL.

FIG. 27—INTERIOR OF THE FINISHING DEPARTMENT OF THE RAIL MILL.

the driving motors are of the large, slow speed, alternating-current, induction type, the extremely slow speed at which the mills operate necessitates the use of gears to reduce the speed for the first four stands. These are the only stands in the mill, however, where the driving is not direct from the motors. The 6,000-horsepower motor running at 75 revolutions per minute drives the three-high blooming mill.

In order to reduce the number of motors and to avoid spreading the plant needlessly, the seven stands of the rail mill proper were arranged in two groups of three,—each group driven by a 6,000-horsepower motor,—and a single stand driven by a 2,000-horsepower motor. The first group consists of the three-high roughing mill, the second edging and the leading rolls, while the second group consists of the dummy, the first edging and the finishing rolls, the forming stand coming between the groups. The speed of the rolls ranges from about 60 feet per minute in the first passes to about 600 feet per minute in the finishing rolls.

Control System of Auxiliary Drives.

The auxiliary driving of roll tables and transfers called for an interesting system of control: In the rolling mill proper there are 21 tables and two transfers, all of which are handled by automatic magnetic torque-limiting control. Eight operators are required and the controllers are mounted, some on the operating pulpits, and some on special platforms located near the motors which they control. Tables, running constantly, are equipped with series-shunt motors, while those which are required to do considerable starting, stopping and reversing are series wound. The control of the transfer tables, the lifting table and the tilting table is entirely automatic and is manipulated by the operator simply throwing his master-controller to the up and down position, the accelerating, running, retarding and stopping being taken care of automatically.

The hot saws are driven individually by 40-horsepower induction motors running at 750 revolutions per minute. The saws are toothed, are 40 inches diameter and run at 1440 revolutions per minute. All five are raised and lowered at one time by a crank shaft operated by a 25-horsepower, series-shunt wound, mill type motor. The cambering machine is driven by a 40-horsepower motor also.

The Hot Beds.

There are four hot beds, operating at right angles to the rail mill and finishing department between which they are located. Each is about 35 feet wide, and they may be operated singly or in

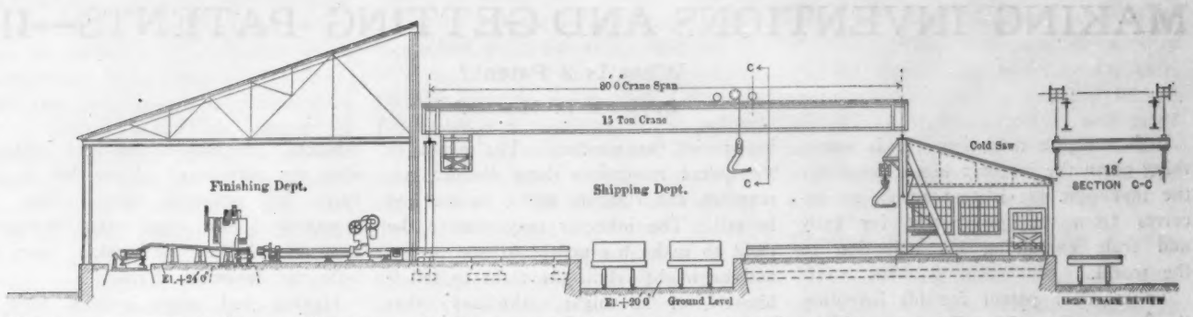


FIG. 28—PLAN AND CROSS-SECTION SHOWING THE FINISHING DEPARTMENT OF THE RAIL MILL, THE COLD SAW DEPARTMENT AND THE SHIPPING PLATFORM.

pairs. They are equipped with a push up for shoving the rails off the delivery table from the saws on the beds and a pull up for dragging the rails from the beds on to the receiving table in the finishing mill. Each table has separate automatic controllers. From the receiving table the rails are delivered in both directions to the finishing department by feed tables similar to those in the rail mill. These tables operate continuously. For delivering the rails from this table to the straightening beds "kick-offs" are used. These are simply bars lying normally below the surface of the table but raised at an angle so that rails are lifted and then slid off by means of a cam on a motor-operated shaft.

The Finishing Mills.

The straightening presses, 18 in number, are driven by 10-horsepower, high-resistance-rotor, induction motors. Opposite the ends of the straightening beds for each straightening press is located a 24-inch headlight, in which is used an ordinary 16-candle-power lamp for the use of the straightener. The drill presses, 18 in number, are driven by 10-horsepower, induction motors with ordinary squirrel-cage rotors.

The general dimensions and arrangement of the rail mill and finishing mill are shown in the accompanying drawings. The mill building proper is 990 feet long and 76 feet wide. The finishing department is 1383 feet long and 55 feet wide and the width between the buildings is 69 feet. The large driving motors are in wings of the main building from which they are separated by solid brick walls. The rail mill is commanded by two 50-ton cranes and the motor rooms by cranes of the same capacity.

Shipping Facilities.

The shipping facilities are unusually complete. After straightening and drilling, the rails are placed on the inspection beds within the finishing department building. The floor of the finishing department is at the same level above the ground as the platform on which are mounted the loading beds. The loading beds can thus be made a continuation of the inspection beds and the rails are simply pushed through a longitudinal opening in the wall out to the loading beds. The two loading platforms parallel the entire length of the finishing department. The one adjacent to the building is 28 feet wide and the opposite one is 54 feet 6 inches wide.

Between the two platforms, in a width of 26 feet at ground level, are run the two shipping tracks. The height of the platforms is about the same as the floor of the freight cars. The loading beds are covered by two special electric cranes which transfer the rails from one part to the other or load them in cars, the rails being handled by means of large special magnets. On the south side of the runway of these cranes is also a small mono-rail crane, whose sole purpose is to deliver rails to the cold-saw bed. The cold saw, a toothed saw 42 inches diameter, making 1800 revolutions per minute is driven by a 100-horsepower induction motor. This saw is capable of cutting an 85-pound rail in 22 seconds, the load varying between 50 and 100-horsepower according to the part of the rail that is being cut.

Alice furnace of the Youngstown Sheet & Tube Co., at Sharpsville, Pa., was blown out March 8.

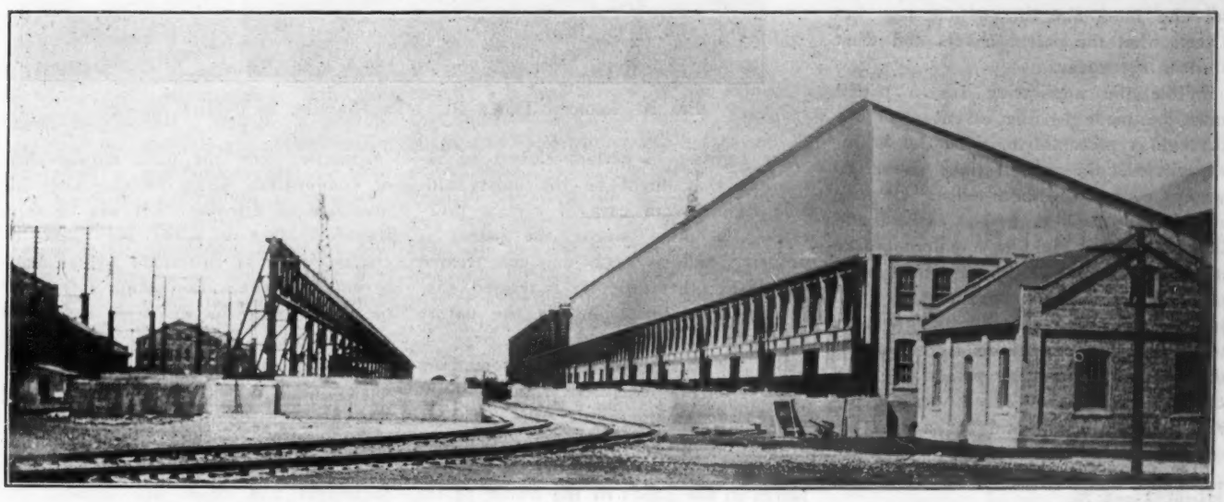


FIG. 29—EXTERIOR OF THE FINISHING DEPARTMENT, SHIPPING PLATFORMS AND SHIPPING FACILITIES.

MAKING INVENTIONS AND GETTING PATENTS—III[1]

What Is a Patent?

By John D. Morgan.[2]

It is not the invention. It is something given the inventor in exchange for the invention. It is that which he receives from the government for fully and truly explaining his invention to the world.

To secure a patent for his invention the inventor must, in the words of the law,

"file in the Patent Office a written description of the same, and of the manner or process of making, constructing, compounding, and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound and use the same."

To pay him for this exposition of his invention, the government secures to him the exclusive use of the invention for a period of 17 years, to make such profits as he may.

A patent right is evidenced by letters patent from the federal government, under the signature of the commissioner of patents and the seal of the patent office, granting to a person or corporation, for the term of 17 years, the exclusive right to make, use and sell the invention. To this grant is attached a printed copy of the drawings and of the specifications as finally prepared by the inventor or his attorney, and it is this drawing and specification that defines the invention, both for the present protection of the inventor and the future use of the public.

The specification concludes with one or more brief statements in more or less abstract or general terms of what the invention is. These are called claims. These claims, as will appear later, above all else mark the line of cleavage between what the patent covers and what it does not cover.

While the application for a patent must be made by the inventor, or his personal representative, when he is incapacitated, the patent may issue to whomsoever the inventor wills. He may sell the invention or a part thereof and he may sell his right to a patent before it issues and the patent may then issue to the assignee. The inventor may sell his rights in one territory of the country to one person and those rights in another section to another person; he may convey those rights for a certain period to one person and for a succeeding period to another. The grant in the patent recognizes three distinct monopolies, the right to make, to use and to sell. The inventor may convey the right to make the article to one person and he might retain the right to sell it himself, or he might make any other sub-division or disposition of his property which might be desirable to him. He might grant the right to use the invention to a person separate from the fringers. He may of his own initiative start the machinery of the law to enforce his property rights under his monopoly. This right exists independent of whether he makes, uses or sells the invention himself.

Having had some general idea of what a patent is we might ask, what, legally, is the invention?

What an Invention Is.

The law states that the inventor shall

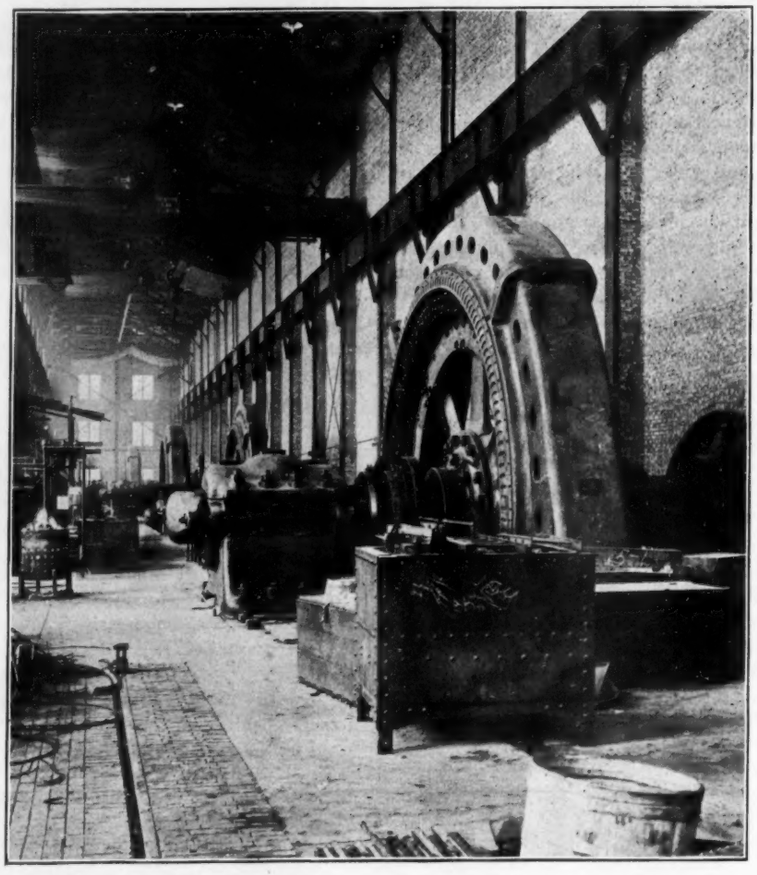


Fig. 30—Looking Down Building Housing Rail Mill Motors.

other rights. In certain classes of invention, this might be the most valuable right, as in case of certain processes. In other words, the patent is property and as such may be treated largely as other property is treated, subject to such limitations as the nature of the property imposes.

But the patent monopoly is something more than the exclusive right outlined above. It embraces also the right to prevent others from making, using and selling the invention. That is, the law places in the hands of the owner of the patent the power to proceed against in-

"distinctly claim the part, improvement or combination which he claims as his invention or discovery." It will be seen, therefore, that it is *by the claim,* or claims, for it is customary to frequently embody within the patent a number of claims, that the invention is defined or construed. What the invention is *in fact* depends on what the inventor has done. What the invention is *in law* depends upon the claims of his patent. What he has invented *in law* determines the measure of his legal protection and often his financial remuneration as well. It will be clear,

[1]The preceding articles of this series were published in The Iron Trade Review of March 18 and 25.

[2]220 Broadway, New York; member of the New York Patent Bar.

therefore, that the skill and foresight employed in drawing the claim determines the measure of protection which the invention is to receive.

The idea that a man is protected in the enjoyment under his patent of everything described therein is entirely erroneous. In fact the law presumes that everything described and not claimed is either dedicated to the public by the inventor or was not his invention. It matters not what a man has discovered, it matters not how clearly he may have described it or how undoubtedly great an improvement it is and valuable in a financial way, unless it had been clearly and adequately claimed there is great danger that he may have secured his patent only to advertise his invention to the world and to see himself deliberately robbed of the fruit of his labor by men who are infringers in fact but, by reason of the defective claim, are not infringers *in law.*

In one of the manufacturing states in New England there has recently been completed a large factory within a stone's throw of an older factory for manufacturing the same kind of machine. This competition has been rendered possible through the negligent drawing of claims in patents owned by the older concern. To be sure the business is capable of supporting both concerns but this is small consolation for the older concern when it realizes how care and foresight exercised *some years ago* in the matter of taking out their patents would have shut out their rivals.

Another instance in mind is that of a man who invented a process now in daily use all over the land, the results of which have been a pleasure and of use to all of us. He realized practically nothing from this valuable invention merely through negligence in securing a proper claim in the patent office.

It is true that a patent is a unity in all its parts, and therefore a well written description, harmonizing with the claims, is valuable. Usually a person competent to draw claims can easily write such a description, and on the other hand the description is valueless without such a claim.

Brief quotations from important decisions on this point will not be devoid of interest. In one the court states "where the import of a claim is clear it cannot be enlarged by the description." In another, the United States supreme court says, "a claim must be construed by its terms when they are clear and cannot be enlarged by the context." As indicating somewhat further the attitude of the courts, the following is taken from another decision: "A court will not press the doctrine of benevolent construction to such an extent as * * * * to confer upon the patentee *what he did not ask for in the Patent office* or to obtain in his patent." The point is well illustrated by these words, taken from the decision in another case: "the claim is void, although the process itself seems to have been a valuable advance, and *if it had been claimed* would have been patentable." (Italics writer's.)

Where Mistakes Fall.

An inventor is bound by mistakes made in the patent office whether of his attorney or the government examiner, and he must pocket his losses with the best possible grace. While the examining corps of the patent office comprises men of great skill and training, they are of course liable to error in common with humanity in general. It devolves upon the inventor or his attorney to guard against such things.

A case illustrating this was one in which a patent was applied for covering a process for repairing asphalt pavements. Two claims were made before the office, one including the step of applying heat to the surface of the street. The other claim included a corresponding step of applying the heat to the surface of the street by means of a blast of flame. The examiner informed the attorney that the subject matter was patentable but that the two claims could not be allowed for the reason that they did not distinguish or differentiate between each other in a patentable sense. The attorney accordingly canceled the claim which provided for applying the heat in the form of a blast and the patent issued with only the other remaining claim.

The patent later came before the United States supreme court on the question of its validity and it was decided that the patent was invalid on the ground that the claim was lacking in novelty. It was shown by the evidence that the process as described in the one claim had been practiced before at a prior time. The application of the heat in the form of a blast, however, was new and valuable, being the only practical, commercial form. Nevertheless the inventor lost his patent for the reason that he had canceled the second claim, involving the application of the heat in the form of a blast, which claim would have given him control of the only commercial form. The examiner was in error in making the requirement for the cancellation of one of the claims, but by acquiescing in this requirement and canceling the claim the inventor adopted this act as his own and was therefore responsible therefor. This illustrates in a very striking manner the necessity for care, good judgment, and a practical knowledge of the mechanic arts as well as of the law of patents on the part of anyone who endeavors to define a valuable invention in the claims of a patent.

Control of Patent Office by Courts.

It is probably generally known that the applicant is not obliged to abide by the rulings of the examiner. He has the right of appeal therefrom to the examiners-in-chief first and thence to the commissioner of patents. However, this does not exhaust his right of appeal because, most important of all, he has the right of appeal on practically all questions of importance from the patent office to the court of appeals of the District of Columbia. This is a Federal court and generally speaking is co-ordinate in rank with the United States courts of appeals throughout the various circuits.

Furthermore, any applicant who has been absolutely refused a patent by the patent office and then by the court of appeals of the District of Columbia may proceed by a bill in equity in any circuit court in the United States and if he can show the court that he is in fact entitled to a patent, the court will issue an order to the commissioner of patents that he grant the patent. This last procedure is very infrequently resorted to, as the patent office is very liberal in its attitude toward inventors. The right of appeal to the court of appeals of the District of Columbia, however, is very frequently exercised.

The point of most interest in connection with this is the fact that the United States courts have control not only over the determination of property rights under issued patents but also in determining the rights of an inventor to a patent and to some degree in shaping the policy and attitude of the patent office toward inventors. There is in England supervision of the patent office by the courts similar to ours in its general features. In Germany, however, the patent office is independent of the courts. While full credit is given to the German patent office for efficiency and a desire to be fair, yet there is a feeling that court control in Germany also would be a salutary thing not only for inventors and their attorneys, but even for the German patent office itself.

Loss of Right to a Patent.

The law specifies several things which

will defeat the right to a patent, as follows:

(1) Knowledge or use of the invention in this country prior to the working of the invention by the applicant for patent.

(2) Knowledge or use in this country for more than two years prior to his filing his application.

(3) The patenting or publication of a printed description of the invention in any country before the applicant for patent made the invention.

(4- The patenting or publication in any country more than two years prior to the filing of the application.

(5) Public use or sale of the invention for more than two years prior to making his application, and,

(6) Abandonment of the invention.

With reference to (1) above, it will be seen that mere knowledge or use of the invention abroad will not defeat the right of an inventor to a patent in this country. It does not, however, entitle a mere importer of foreign ideas to a patent here. Use in this country must be something more than tentative or accidental, it must have been a practical use. On the other hand, however, it need not be universal or widely known. Prior use in order to defeat a patent must be shown by clear and satisfactory evidence, and it must be established beyond a reasonable doubt. A patent for a tin can was attacked on the ground of prior use and knowledge by others, and was declared invalid on the showing that 150 cans made here in accordance with the claim of the patent were sold to the French government.

The foregoing relates to use by persons other than the inventor and he can overcome such evidence by showing that he made the invention prior to such use. If, however, the use is carried back more than two years prior to the filing of his application, he is still precluded by (2) above from getting his patent.

By (3) above, while foreign use or knowledge will not defeat the right to a patent of an independent inventor here, yet the patenting or publication of a description abroad will defeat the right of such an inventor in this country, as will also publication in this country. Proofs to establish such patenting or publication must likewise be clear and positive. The patentee can likewise carry his date of invention back of such patenting or publication, subject to the limitations of (4).

Paragraph (5) refers also to public use or sale by the inventor or patentee and those deriving under him. The legal presumption of dedication to the public after two years public use of the invention comes in and cannot be explained away by testimony as to the actual intentions of the inventor. This legal presumption of dedication to the public is analogous to that in the case of anything described but not claimed in a patent. An offer to sell the device of a patent made more than two years before the filing of the application has been held to be sufficient to defeat the patent.

Mere experimental use is not public use although it may occur in view of the public. Experimental use ends and public use begins as soon as the success of the invention is demonstrated. The proof of such use or sale must be of the same kind as indicated in the other cases given. But when the use or sale is established the burden of proof is on the inventor or patentee to show that the use was experimental. Fraudulent or piratical use or sale entered upon by other parties to injure the inventor will not bar or invalidate a patent. Many patents have been declared invalid for prior public use. Mason's fruit jar patent, and the patent for the street cable railway were both declared invalid on this ground.

With reference to abandonment of the invention by the inventor prior to making application for patent, it was held in one case that a description in a public print including a declaration that the invention was open to anybody, and prior to his application other parties relying on such statements had acquired rights, the inventor was held to have abandoned the invention and to have dedicated it to the public. Evidence of abandonment must be clear and conclusive to defeat a patent.

If the disqualifying facts come before the patent office while the application is pending, a patent will be refused. If they come up for the first time in suit involving the validity of the patent, the court will declare such a patent invalid.

The purpose of the law is to give an inventor ample time to complete his invention and then to compel him to come forward and assert his monopoly before the public, or other parties may reasonably be led to presume that he does not mean to patent it and acting on such presumption acquire interests which might be prejudiced by his later assertion of his claim to the patent monopoly.

BOOK REVIEW.

"The Steam Turbine." By James Ambrose Moyer. New York. John Wiley & Sons. 6 x 9 inches. 370 pages. Illustrated. Cloth. Supplied by THE IRON TRADE REVIEW for $4.

This book is an addition of distinct value to the literature on the subject of steam turbines. The author has reversed the usual order of developing the subject, presenting first the elementary theory of heat and the problems of nozzle design. This is followed by a discussion of steam turbine types and blade design. In this manner the author has presented the simpler problem first and, it seems to us, in the most logical order. The first chapter, which is entitled, "The Elementary Theory of Heat", discusses and explains in a simple manner the entropy-temperature diagram. The treatment of this usually difficult subject is most lucid, and those who have had trouble with it can well afford to read this chapter of the book. The second chapter on nozzle design presents numerous formulae as to the dimensions of nozzles and explains clearly the effect of variations in the shape of a nozzle on the action of the steam passing through it. The calculations are carefully worked out in a form, which should prove of material value to the designer. Chapter IV discusses the various types of steam turbines and distinguishes clearly between the impulse and the reaction turbine, the action of the steam in the various parts being illustrated by means of velocity diagrams, the use of which is explained in connection with the laying out of a turbine. Chapter VI discusses the method of making steam turbine tests to reduce them to standard conditions, while Chapter VII is devoted to illustrations of commercial types of steam turbines. Complete installations, cross sections, details and economy curves of various types of turbines are illustrated, the principal attention being given to turbines of the Westinghouse-Parsons and Curtis types. The other types are discussed rather briefly. Methods of testing are briefly noted in Chapter XI, while steam turbine economics form the subject of Chapter XII. Chapter XIII is devoted to stresses in rings, drums and discs, while Chapter XIV treats of the subject of gas turbines. It is regrettable that an otherwise excellent book should be marred by such a careless error as the use of the plural noun "data" with the singular verb "is". This error occurs a number of times throughout the work and should be corrected in the next edition.

A ROLLING LIFT BRIDGE IN BURMA

In August, 1904, the Burma (India) Railways Co. commenced work on an extension of its lines from Henzada to Kyangin. This necessitated the construction of a bridge to cross the Ngawun river about 16 miles from Henzada. It was originally intended to construct this bridge of fixed spans grading up the approaches so as to provide a clearance of 40 feet underneath the bridge for the passage of vessels, but as this clearance required a grade of 1 in 200 it was decided to reduce the grade to 1 in 300 and contruct a movable bridge for the accommodation of navigation.

Extensive navigation is carried on along the Ngawun river by the Irrawaddy Flotilla Co., which operates a line of steamers for both freight and passenger traffic. For the accommodation of the navigation interests the government authorities required a clear channel of 200 feet, which, with the local conditions to be met, caused a careful consideration to be given as to the most suitable type of moveable bridge. A double leaf through Scherzer rolling lift bridge was selected as possible of fulfilling all of the conditions, and arrangements were made with the Scherzer Rolling Lift Bridge Co., of Chicago, for designs, plans and specifications.

The bridge was fabricated at the works of Messrs. Spencer & Co., Melksham, Wiltshire, Eng., and was shipped by them to Burma, after having first been erected temporarily at their works.

The superstructure consists of a double leaf through single track Scherzer rolling lift bridge having a span of 220 feet center to center of bearings, flanked on each side by a through truss approach span of 160 feet, with one additional approach span on one side and two on the other of about the same span length. The substructure consists of brick masonry piers founded on wells, the type of construction generally used in India. The design of the bridge was based on the specifications of the government of India for railway bridges.

The superstructure of the fixed spans was erected on false work composed of frame bents resting on piles, there being four towers of two bents each for each approach span. The leaves of the bascule span were erected in the open position by means of a sliding derrick which was raised on the open leaf as each panel was added.

The track girders on which the moving leaves roll in opening and closing are carried by the adjacent fixed spans, eliminating the piers usually provided to support the rear ends of the track girders. One of the distinguishing characteristics of the design of this bridge is the economical arrangement and the small size of the piers, providing ample support to the superstructure with the least possible obstruction to the flow of water. The rivers in India during the rainy season are subjected to heavy floods and obstructions to the flow of the water cause deep holes to

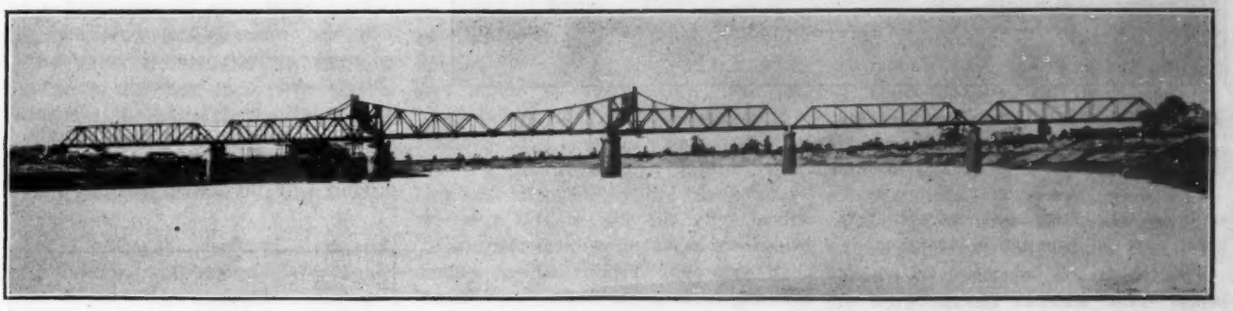


FIG. 1—SCHERZER ROLLING LIFT BRIDGE OVER NGAWUN RIVER, BURMA. IN THIS VIEW THE RIVER IS AT LOW STAGE.

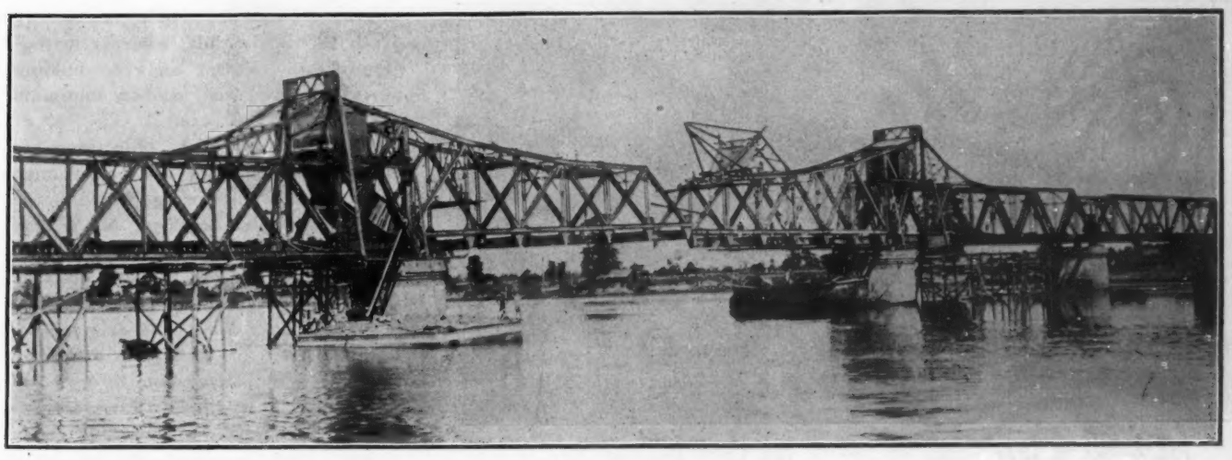


FIG. 2—BOTH LEAVES OF BRIDGE COUNTERBALANCED AND OPERATED TO THEIR CLOSED POSITIONS WHEN NEARING COMPLETION—OCT. 22, 1908.

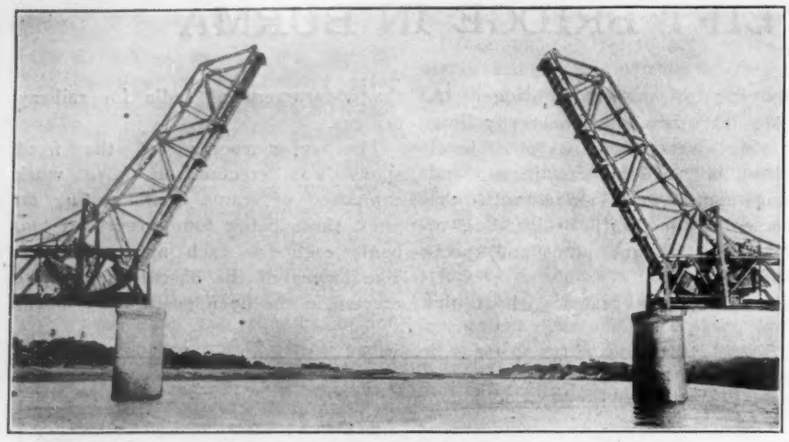


FIG. 3—TWO LEAVES FORMING MOVABLE SPAN COMPLETED AND IN PARTLY OPENED POSITION—DEC. 2, 1902.

scour in the river bed, necessitating great care in foundation design.

The bridge is operated by hand power from winches on the deck of the approaches, transmitted by a system of gearing to the main operating struts, of which there are two on each leaf outside of the trusses, the center line of the struts coinciding with the center line of the approach trusses. The two winches for operating each leaf are located on platforms on the outside of the approach spans.

The substructure was completed and erection started in the spring of 1908, and the bridge finally completed and opened to traffic early in December, 1908.

This is the largest movable bridge yet constructed in Asia, and its successful and satisfactory completion will undoubtedly lead to the construction of other bridges of this type where similar problems are to be solved. By the use of this type of bridge the base of rail can be placed at a minimum distance above water, effecting a large saving as compared with the cost of a fixed bridge elevated a sufficient height above the water to allow the passage of vessels underneath the bridge, in which case long and high embankments would have to be constructed to reach the bridge level. The grades would be a perpetual tax on all traffic crossing the bridge.

The work was executed under the supervision of Messrs. Rendel & Robertson, consulting engineers, 8 Great George street, Westminster, S. W. The Scherzer Rolling Lift Bridge Co., Chicago, designed the superstructure of the bascule span and the two adjacent approach spans in cooperation with the engineers of the railway company. The substructure was designed by the railway company.

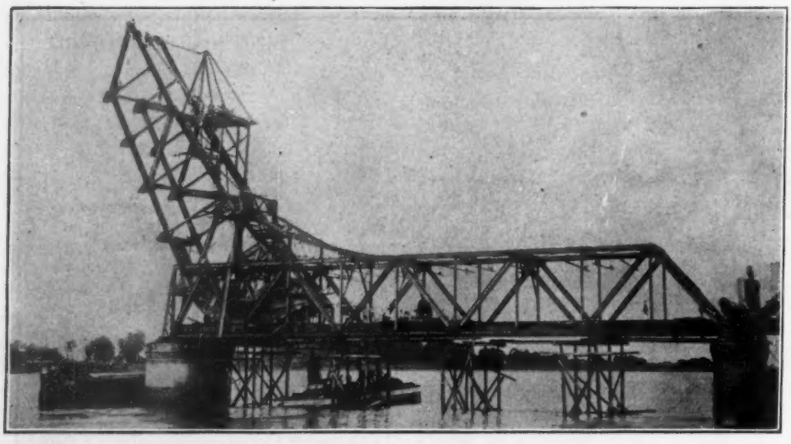
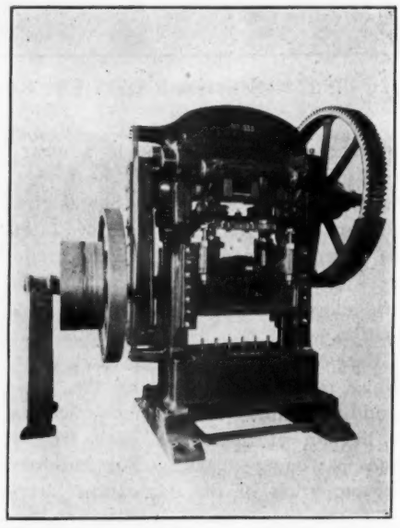


FIG. 4—SOUTH LEAF BEING ERECTED IN THE OPEN POSITION, AND SLIDING DERRICK USED IN ERECTION.

A "BLISS" DOUBLE CRANK TOGGLE DRAWING PRES.

The drawing and stamping of large forms of irregular shape, such as trays, stove tops, seamless roasters, and a very large line of similar work, where the drawing and stamping is made one operation, is today done in large double crank presses, in connection with heavy spring pressure attachments. It is claimed by those familiar with the application of toggle drawing presses, that in drawing metal goods, such as mentioned above, much superior and more uniform results can be accomplished by their use, compared to those obtained by using spring pressure attachments. This is said to be especially so where the article to be drawn is of any great depth, as the greater the depth of draw, the more varied is the pressure produced by the spring attachment on



BLISS DOUBLE CRANK TOGGLE DRAWING PRESS.

the blank. With the spring pressure attachment, the amount of power consumed, when the article is of any depth, is considerable, whereas in toggle drawing presses an even holding pressure is secured, and a minimum amount of power used.

To overcome the objections to drawing the class of work mentioned under rubber and spring pressure, the E. W. Bliss Co., Brooklyn, N. Y., has designed a new type of press known as the double crank toggle drawing press, which is built in 10 sizes, and illustrated herewith. The original design of this type press was made by the Bliss company some three years ago. The press shown, however, has been re-designed to embody such changes and improvements in detail of construction as recent experience

has demonstrated to be of advantage. The frame of the press is of large proportions and is cast in one piece, giving a maximum of strength and rigidity. The punch slide has a stroke of 8 inches, and is actuated by a high carbon hammered steel double crank shaft of large diameter. The pressure on this slide is distributed over two points, by means of screw connections, which latter are geared together, and work in unison when adjusting the slide, insuring perfect alignment at all times. This adjustment is accomplished by the oscillation of a ratchet lever.

The blank holder slide, which has a stroke of 6 inches, encases the punch slide, and the pressure on it is distributed over four points by means of heavy steel screws. This slide is actuated by the "Bliss" patented toggle motion.

The toggles are made of steel and receive their motion from the crank shaft through the medium of an outside slide. This slide is operated by a crank connection on the end of crank shaft. The blank holder slide mechanism is perfectly balanced to avoid all undue strain thereon. The construction insures all stress borne by the blank holder slide being taken up by the press frame. At the beginning of the stroke, the blank holder slide first moves down, while the punch slide first moves upward a trifle, and then downward with the blank holder slide, but somewhat behind it. When the blank holder slide dwells, the punch slide continues its downward movement, and forces the blank into the die, causing it to slip between the lower side of the blank holder and the upper face of the die, under a uniform and even holding pressure. The punch slide then moves upward together with the blank holder slide, and the drawn and stamped shell is pushed out of and to the top of the die, by means of a knockout actuated by the blank holder slide.

The press shown will receive and handle a 42-inch x 23-inch blank of No. 14 gage steel, or smaller blanks of heavier stock in proportion. It will take a drawing punch 12 x 36½ inches. A patented jaw clutch, entirely of steel, is used on this press, and all gears are cut. The main gear is 73 inches diameter with an 8-inch face. The fly wheel is 62 inches diameter, with a 6-inch face, and weighs 1,800 pounds, the press makes 30 strokes per minute, and the driving shaft runs at 205 revolutions per minute. The total height of the press is 10 feet 9 inches, and the floor space over all is 12 feet 2 inches x 7 feet 3 inches. It weighs complete approximately 42,000 pounds.

TWO NEW "AMERICAN" MACHINE TOOLS.

The American Tool Works Co., Cincinnati, O., has developed a new line of crank shapers, of which the accompanying illustration of the 21-inch size is representative, designed for both accurate tool room work and the heavier operations of manufacturing. The column is of unusually substantial design and the extension of the base provides a rigid support for the table, a decided advantage in cases where operations are to be performed on relatively large and heavy work. The table is detachable from the apron and the bearings of the latter on the rail and

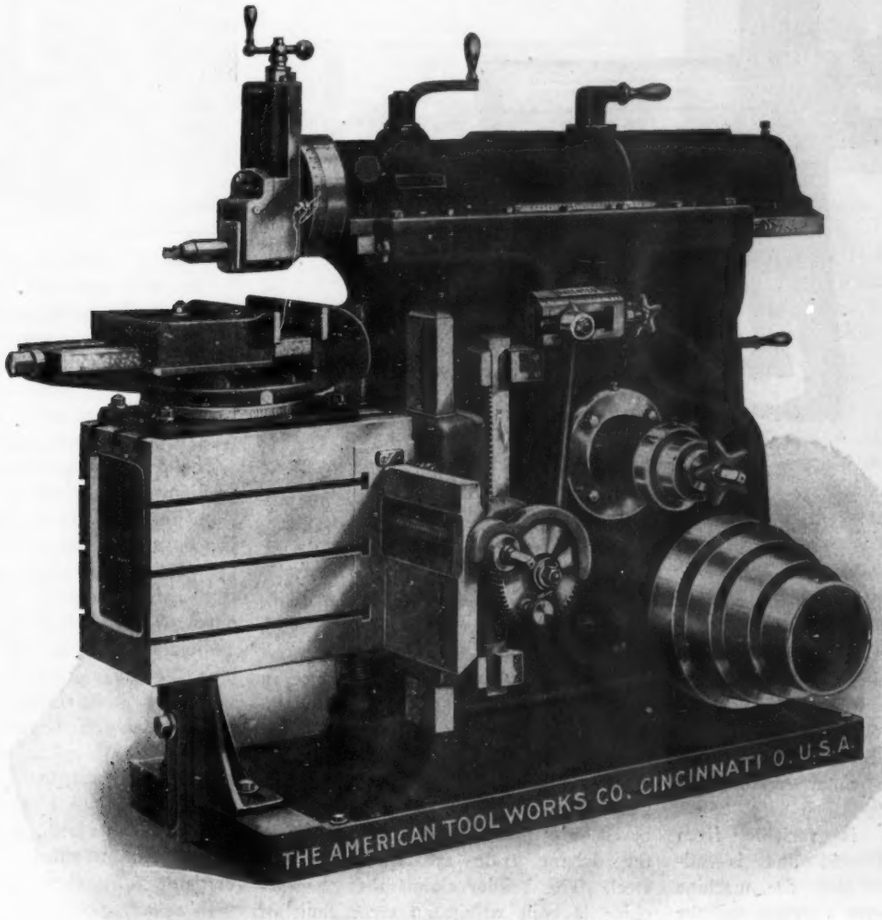


FIG. 1—"AMERICAN" 21-INCH BACK GEARED SHAPER.

Test Sheet 21-Inch B. G. Shaper.

Material.	Depth of Cut, Inches.	Feed per Stroke, Inches.	Cutting Speed, Ft. per Min.	Belt on Cone Step.	Back Gear Position.	Revolutions of Cone.	Length of Cut, Inches.	Amperes at Tool.	H. P. at Tool.	Voltage.
Close Grained Cast Iron 18 Inches Stroke	3/16	0.080	11.4	2	in	157	13½	9	2.65	220
	5/16	0.160	16.3	3	in	225	13½	24	7.07	220
	5/16	0.200	11.4	2	in	157	13½	21	6.19	220
Machine Steel Very Tough 21 Inches Stroke	½	0.080	11.4	2	in	157	14	21	6.19	220
	½	0.096	11.4	2	in	157	14	24	7.07	220
	5/16	0.080	11.4	2	in	157	14	32	9.43	220

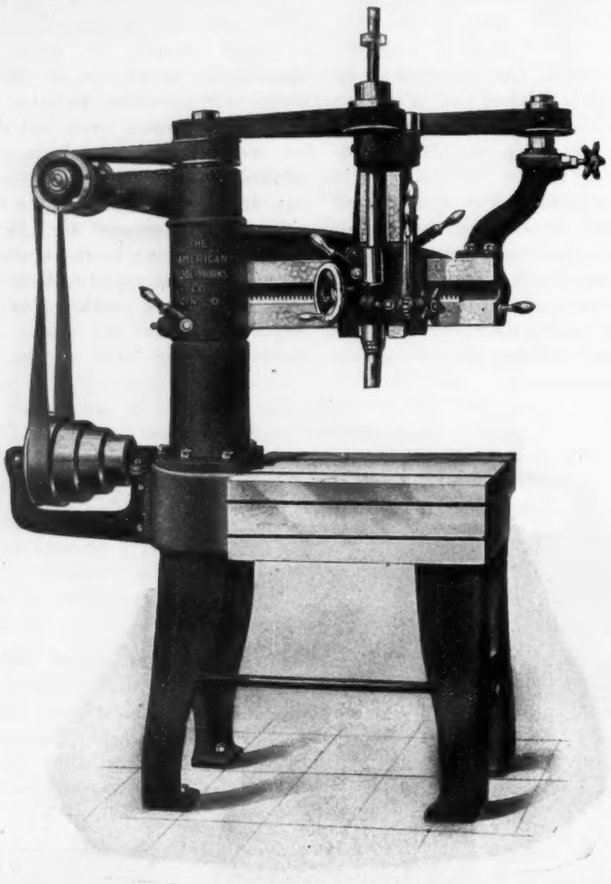


FIG. 2—THE "AMERICAN" SENSITIVE RADIAL DRILL.

of the rail on the face of the column are liberal. The ram is of a rigid design and has eight changes of speed, from 7.7 to 96 strokes per minute. The length of stroke, as well as the position may be varied without stopping the machine. The down feed screw is fitted with a graduated collar reading to 0.001-inch.

The cross feed is variable from 0.008-inch to 0.200-inch, and is adjustable without stopping the machine by means of the lever operated on the graduated slotted head shown.

A very desirable feature is the dividing of the rocker arm at top end, which allows of passing long work through the column, as for instance in key-seating shafts. The back gear ratio is very large, 24.3 to 1, which with the large diameter and width of cone steps, gives the machine great power. All gears are cut from solid stock; the bevels are planed and the pinions in the driving train are cut from bar steel. The builder claims that the machine is built within an error limit of 0.001 inch for full stroke. The test sheet of the 21-inch shaper testifies to its rugged character and shows the power absorbed.

Radial Sensitive Drill.

We also illustrate a high speed "sensitive" radial drill designed by this company, and for which the maker claims absolute priority of design. This machine is designed particularly for the enormous amount of drilling, which can be done in the smaller sizes of drill, say up to ¾-inch, the most profitable speeds of which lie beyond the range possible in machines built for more general use. The general features are fully shown. It will be seen that there are no gears in the spindle drive, which makes for quiet running. The pulleys, except, of course, the cones, are all fitted with double ball bearings, and are dust proof and self lubricating.

The speed range is from 300 to 900 revolutions per minute and the machine is built with 2-foot and 3-foot arms; the former will drill to the center of a 49-inch circle and the latter 73 inches, outside of the column. It will be noted that, while vertical movement of the arm is not provided, the same end can be attained with greater facility by the saddle on the head. The maker has driven a ¾-inch drill 10½ inches per minute in cast iron, with a drill speed of 375 revolutions per minute, or 73.7 feet per minute, the corresponding rate of feed 0.028-inch per revolution, consuming 3¼ horsepower. A tapping attachment can be added, when desired.

A HEAVY SINGLE CRANK PRESS.

The accompanying illustration shows an unusually large and powerful single crank press designed and built by the Toledo Machine & Tool Co., Toledo, O., for making large stampings in the heavier gages of metal for which there is a rapidly increasing demand.

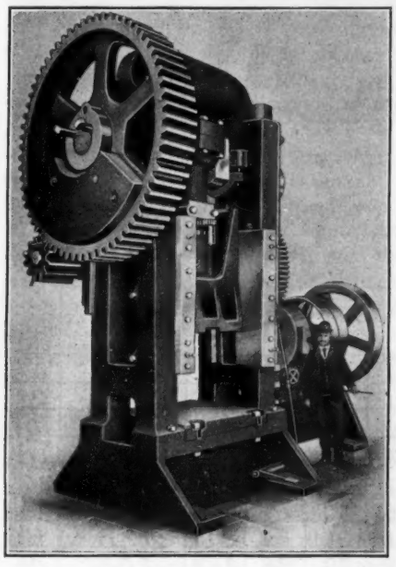
The press is operated by a powerful friction clutch which is designed to release instantly when the press is subjected to an overload of from 20 to 25 per cent, in this way providing a positive safety against damage to other parts. The clutch is also fitted with an automatic releasing mechanism for stopping the press at the high point of its stroke at each revolution. This automatic release is operated by a foot treadle in a similar manner to other presses of this type.

In addition to this foot treadle for operating the clutch, a hand lever control is also provided which enables the operator to start or stop the press at will at any point of the stroke. The clutch is powerful enough to permit

stopping the press at the low point on the downward stroke when the maximum pressure is being exerted by the ram, and to again start the press instantly under this load.

The pedestal bearings for the friction clutch, balance wheel and pinion shaft are mounted on an independent bed. This shaft is fitted with automatic ring oiling bearings.

The auxiliary. or detachable, bed construction eliminates the undesirable feature of an outboard bearing and provides a positive method of accurate alignment of the belt pulley and pinion shaft with the gear shaft attached to main frame. This bed is accurately bolt-



TOLEDO SINGLE CRANK PRESS.

ed and tongued to the main bed of the press frame, which prevents any possibility of the bearings becoming loose and getting out of alignment.

This press, when so ordered, is supplied with a twin gear drive, although this is considered superfluous by the manufacturers. The gears illustrated are machine cut and of a special grade of high tensile strength cast iron, and being of wide face and very large pitch, the possibilities of breakage or unusual wear caused by overloading the press is practically eliminated.

The crank shafts and connection screw are of special grade open-hearth high-carbon hammered steel, very hard and unusually tough. Both the upper and lower connection bearings are fitted with substantial phosphor bronze bushings, the connections themselves being of cast steel.

The press frame is of the four-piece construction, reinforced by four heavy steel tie rods of large diameter.

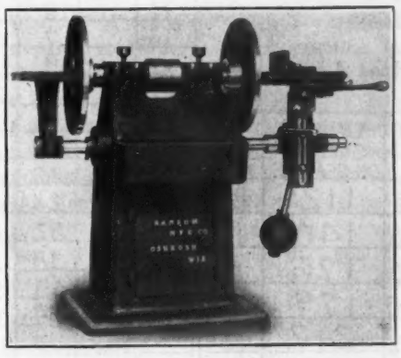
The principal dimensions of this machine are: Stroke or slide motion, 24 inches; distance bed to slide, stroke and adjustment up to 60 inches; press capacity in pressure exerted by ram about 1,250 tons; complete weight of machine, about 125,000 pounds.

THE RANSOM 18-INCH GRINDER.

The accompanying illustration shows the Ransom 18-inch lever feed table disc grinder, which has just been placed on the market by the Ransom Mfg. Co., Oshkosh, Wis.

The machine, as shown in the illustration, has two discs, which are of steel, turned true to a limit of 0.001 inch. They are fastened to

The shaft upon which the tables are supported is so arranged that it can be lined up parallel to the arbor. The machine, as shown, has two tables, that on the right hand end being arranged to oscillate on the arm, and it can also be raised or lowered. This table is 7 x 12 inches and is provided with two T-slots. It is so arranged that it can be tilted to any angle necessary to the face of the disc. It has a lever feed with an adjustable screw stop. The table on the other end of the machine



RANSOM 16-INCH DOUBLE DISC GRINDER.

is 6 x 18 inches and is squared to the face of the disc.

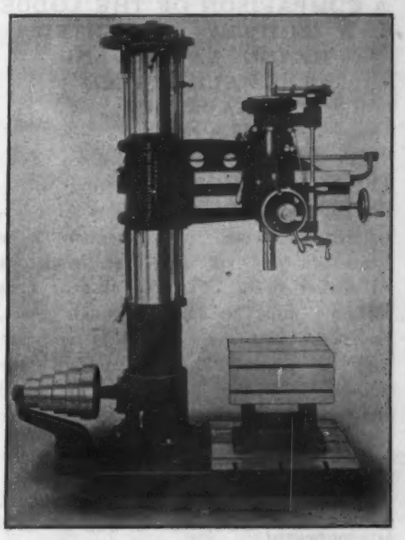
All wearing surfaces of the machine which are exposed to emery, are dust proof. The base of the machine is arranged to hold wrenches and tools and the clamp is so built that the top can be swung out of the way to give free access to the disc. The metal discs are not provided with grooves, unless specially ordered, as it is claimed that better work is done without the groove. The following are the principal dimensions of the machine:

Steel disc	18 x ¾ inches
Pulley on arbor	5 x 5¼ inches
Countershaft pulleys	10 x 6¼ inches
Revolutions of countershaft	500 per minute
Bearings	6 x 2⅞ inches
Right hand table	7 x 12 inches
Left hand table	6 x 18 inches

A NEW RADIAL DRILL.

The accompanying illustration shows a 2½-foot cone-driven radial drill, which has been recently designed and placed on the market by the Mueller Machine Tool Co., Cincinnati. This drill is one of a line comprising 2½, 3 and 3½-foot drills, and are an addition to the regular line of standard radial drills built by this company. The feature kept in mind in the design of this machine was to provide the greatest possible convenience for the operator. Careful consideration was also given to labor saving devices.

The clamp is of heavy section



THE MUELLER RADIAL DRILL.

throughout and is bolted to the base, affording exceptional rigidity and giving resistance to heavy strains. The arm is of pipe section and so designed that it cannot be twisted while resisting the upward pressure of the spindle when heavy drilling is required. It is raised and lowered rapidly, being instantly controlled by a lever on the cap which is within easy reach of the operator and is clamped to the column by two tightener handles, as shown.

The spindle, which has a quick advance and return and is counterbalanced, has ten changes of speed, all immediately available. It is made of forged steel and ground to size. The correct speeds for all kinds of drilling are shown on a bronze plate attached to the arm, enabling the operator to quickly select the proper speeds, which may be manipulated while the drill is in action. The head is traversed by means of a double thread screw of quick pitch and is equipped with a suitable locking device. The machine is equipped with a tapping attachment, which is so arranged that

an adjustable gage screw causes the tap to slip when it reaches the bottom of a hole.

The starting, stopping and reversing lever is locked on the head directly in front of the operator. The automatic feed has four changes and can be used as a positive or friction feed. Changes of feed can be made with the drill in motion. The feed gear is especially adapted to the use of high speed steel drills.

All gears, both spur and mitre, are planed theoretically correct. All shafts are ground to size. The machine can be furnished with any style of table.

A COMPARISON OF THE LODGE & SHIPLEY "PATENTED HEAD" LATHE AND THE "ALL-GEARED" HEADSTOCK LATHE.

The Lodge & Shipley Machine Tool Co., Cincinnati, O., is drawing attention to some interesting points of comparison between its patented lathe headstock and its all-geared headstock of earlier design. In the all-gear type all cuts must be taken through gears, since the belt drive speed is constant and is entirely independent of the spindle. The result is that on small diameters and light cuts the gear speeds are high and rapid wear and increasing noise are a consequence. Further, the spindle gears are necessarily of wide face and coarse pitch, and under such conditions cause chattering and marking of the work. In its own experience the company found the deterioration of the all-gear type so great that it had to be replaced in about three or four years. The newer design permits of the smaller diameters and the lighter cuts being taken through the open belt drive, the spindle pulley being clutched to the spindle gear. A portion of the total speed variation is effected through variable-speed countershafts in either case. The tables show the range of work effected through the open belt drive.

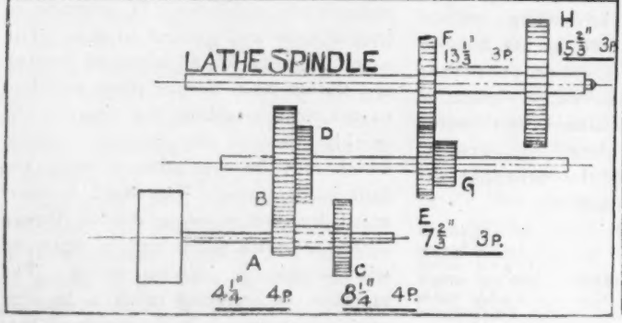
Officials of the Allis-Chalmers Co., Milwaukee, Wis., deny the report published in Milwaukee daily newspapers late last week that three new buildings of large dimensions would soon be erected as additions to the West Allis plant.

REPAIRING CAR PLATES IN POSITION.

The rapidity with which the steel car is supplanting the old wooden type has been due in considerable degree to the opportunity afforded by the former for the making of repairs with greater ease and economy. A large part of this work consists merely in straightening out bent and battered plates and can be done in place, without the additional cost of removing the injured section; for such purposes as this portable tools have been particularly designed and have found wide favor. The Hauck oil burner, being entirely portable and self-contained so that it can be used in any position, has been brought out especially for use in building and repairing steel cars, repairing engine frames, expanding tires and discs, boiler making, pipe bending and similar work common in the railroad, boiler and machine shop. The accompanying illustration shows a burner in operation on car repair work.

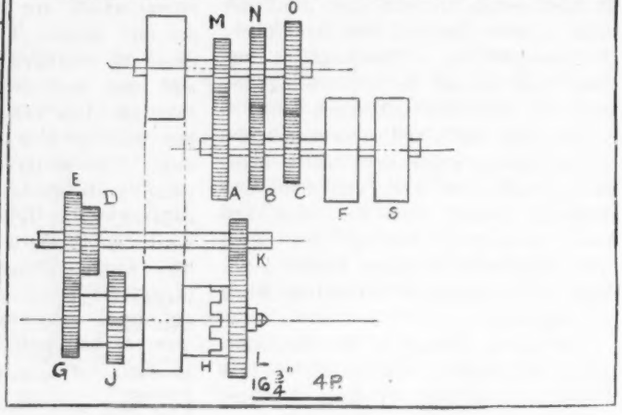
Speeds Available in "All Geared" Head Lathe.

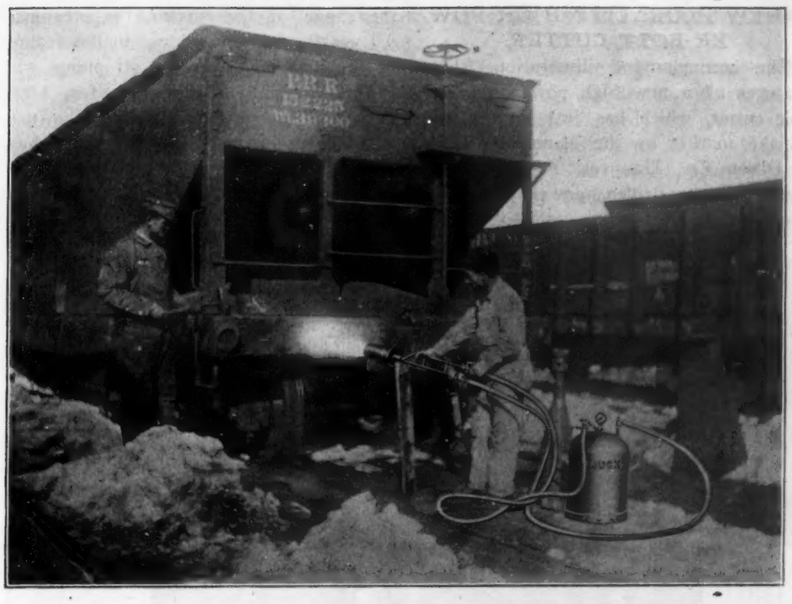
SPINDLE SPEEDS ALL OBTAINED THROUGH GEARS	SURFACE SPEED ON WORK IN FEET PER. MINUTE					PERIPHERY SPEED ON GEARING	H.P. OF DRIVING BELT
	2"	4"	6"	8"	20"		
28	15	29	44	59	148	112	12
35	18	37	55	73	180	140	15
44	23	46	69	92	230	176	18
51	27	53	80	106	260	179	12
62	32	65	97	130		217	15
77	40	81	121	161		270	18
93	49	97	145	195		376	12
114	60	119	179	239		457	15
141	74	148	221	296		494	18
172	90	180	270			680	12
210	110	120				750	15
260	115	230				911	18



Speeds Available On "Patent Head" Lathe.

SPINDLE SPEEDS BACK GEAR	SPINDLE SPEEDS OPEN BELT	SURFACE SPEED ON WORK IN FEET PER. MINUTE 2"	4"	6"	8"	20"	PERIPHERY SPEED ON GEARING	H.P. OF DRIVING BELT
11		6	12	17	23	57	48	6½
13		7	14	20	27	68	56	8½
17		9	18	27	36	88	72	10½
21		11	22	33	44	110	91	11½
26		13	27	40	54	135	112	16
32		16	33	50	66	167	138	19
39		20	41	61	82	204	168	6½
47		24	49	73	98	247	203	8½
61		32	64	96	128		264	10½
73		38	76	114	153		315	11½
93		49	97	146	195		401	16
112		59	117	176	234		484	19
	143	75	150	224	299		OPEN	6½
	174	91	182	273				8½
	220	115	230				BELT	10½
	268	140	280					11½
	340	178					CUTS	16
	414	216						19





THE HAUCK OIL BURNER IN USE.

Aside from the powerful and even character of the flame, an important feature is found in the fact that it can be regulated either to heat a large surface or concentrated on a small area. The rapidity with which work of this character can be done is illustrated by a job recently handled with an ordinary No. 2 burner; a steel plate one-half inch thick and measuring 6 by 10 feet was bent to right angles the longer way in 15 minutes, a space 8 inches wide by 10 feet long being heated for this purpose. The burner is also adapted for brazing and welding work. It is built by the Hauck Mfg. Co., Brooklyn and New York city.

THE REYNOLDS HOBBING MACHINE.

The accompanying illustrations show features of a new hobbing machine which has just been placed on the market by the Reynolds Machine Co., Moline, Ill. The machine has a number of features which are radical departures from standard practice in this line. The work is carried past the hob instead of traversing the hob past the work. This construction avoids the necessity of securing and maintaining exact parallelism between the line of travel of the moving part and the axis of the stationary member. The head carrying the hob is fixed in position, so that there is no necessity for bevel gears or universal joints or any other device to compensate for a varying angle of the hob with the work. The driving of the hob is practically a similar problem to driving the spindle of a milling machine. In order to maintain the proper relationship between the hob and the work the hobs are made in sizes which vary with the pitch, so that the thread angle of all hobs is the same. When the reduction of the size of the hobs with the finer pitches makes the hob of too small diameter to be practical, multiple thread hobs are used, in order to give a hob of reasonable dimensions.

Referring to the illustration, Fig. 1, it will be noted that the spindle carrying the work is mounted in a carriage and driven by a broad face spur master gear, which is in turn driven by the worm of the same thread angle as the hobs. This construction brings the worm shaft and the hob shaft parallel, which renders their connection, in order to secure the proper rotary speed of the work, a matter similar to gearing the lead screw of a lathe.

The work spindle is mounted in a carriage, which is fed by two racks on the underside and with which mesh two pinions on a shaft fixed in the knee. This construction brings the thrust of the feed approximately in line with the thrust of the cut, being a little to one side on small gears and a little to the other side on large gears. In this way the wear on the carriage is reduced and such wear as does occur is equalized.

An outboard support is provided

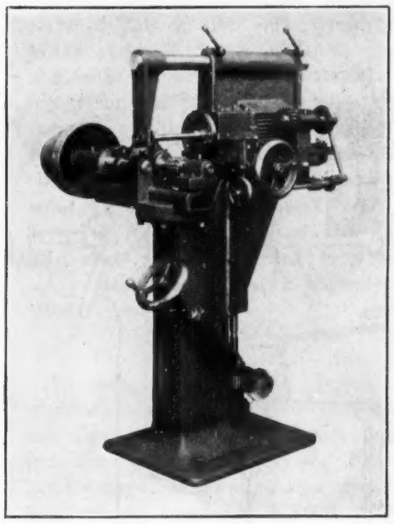


FIG. 1—REYNOLDS HOBBING MACHINE, SHOWING WORK CARRIAGE TRAVERSING MECHANISM AND LOCATION OF DRIVE PULLEY.

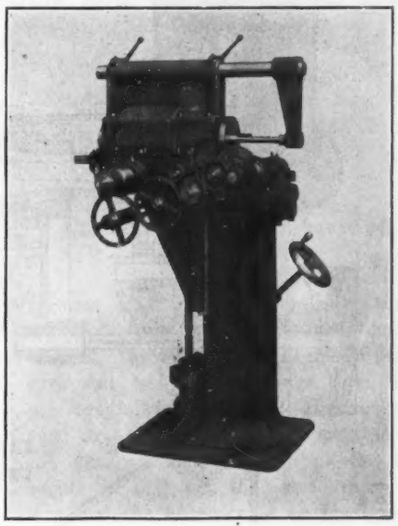


FIG. 2—REYNOLDS HOBBING MACHINE, SHOWING GEAR TRAIN FOR OPERATING WORK CARRIAGE TRAVERSING MECHANISM.

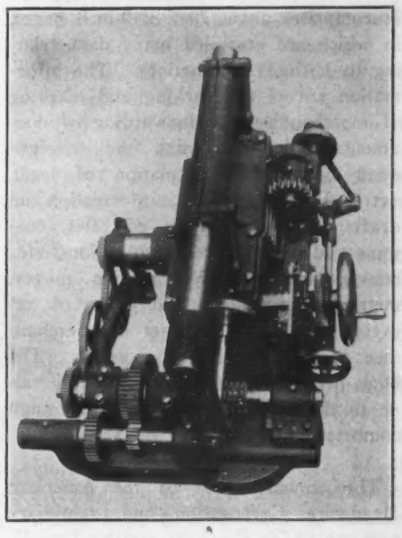


FIG. 3—TOP VIEW OF REYNOLDS HOBBING MACHINE SHOWING RELATION OF GEAR TRAIN AND CARRIAGE TRAVERSING MECHANISM.

for the work arbor, which reduces the liability to chatter, which, in many cases is the limiting factor in the quantity of work accomplished by the machine. As shown by the illustration, the tool is simple in design and construction and has no parts which are liable to derangement. It may be set up and operated by comparatively unskilled labor.

The machine is driven by a three-step cone, and is back-geared, giving six changes of speed in geometrical progression. It is built with special reference to the use of high speed hobs. The machine now being placed on the market is built to cut up to six diametral pitch in steel and five diametral pitch in cast iron. It will handle work of any size up to 12 inches pitch diameter and 6 inches face. Other sizes will be placed on the market within a short time. The weight of the machine complete is about 1,400 pounds.

Suit Over Stock.—Charles D. Warren, president of the Lake Superior Corporation and of a Toronto bank, has brought suit for $150,000 and interest from Dec. 1, 1904, amounting in all to $193,150 against Francis H. Clergue. Warren charges that Clergue promised him $500,000 par value of the company's stock if he would accept the presidency of the Lake Superior Corporation, and failed to keep his promise. Philadelphia stockholders profess to be greatly interested in the hearing of the suit brought by Warren.

A convenient book has been issued by Oelrichs & Co., 5 Greenwich street, New York, entitled "Aids to Shippers." It comprises about 70 7 x 9-inch pages, in which are compiled many data relating to business transactions. The information covers the packing and marking of merchandise, the forwarding of documents, rules governing the consignment of goods, explanation of legal, net and gross weights, information on drafts, insurance, terms of sales, customs and duties, foreign collections, etc., conversion tables for foreign money, metric measurements and tables of express rates for shipments of merchandise to all parts of the world. The book presents much information of value to those doing business with foreign countries.

The annual report of the American Hardware Corporation and subsidiary companies for the year ending Dec. 31, 1908, showed that the net earnings had decreased 35 per cent compared with the previous year.

A NEW PLURALITY HIGH POWER BOLT CUTTER.

The accompanying illustrations show features of a new high power plurality bolt cutter, which has just been placed on the market by the Mummert, Wolf & Dixon Co., Hanover, Pa. The machine is gear driven, power being obtained from a constant-speed belt pulley. Within this pulley is a friction clutch for starting and stopping. The speed variations are obtained from a set of tumbler gears, which engage the main drive gear in the spindle. By moving the tumbler gear handle, so that the required pinion comes in mesh with the large gear, any speed within the range of the machine is obtained. All gearing is enclosed within the frame of the machine as is the oil pump.

The machine is designed for high duty and is rigid, permitting the use of high speed steel dies. The base has a solid bottom and is constructed so that all the oil drains to the suction pipe of the pump. The oil tank in the bottom of the machine is divided by an overflow, which catches all metal particles, the oil flowing over the dividing ribs and being delivered to the pump in a fairly clean state.

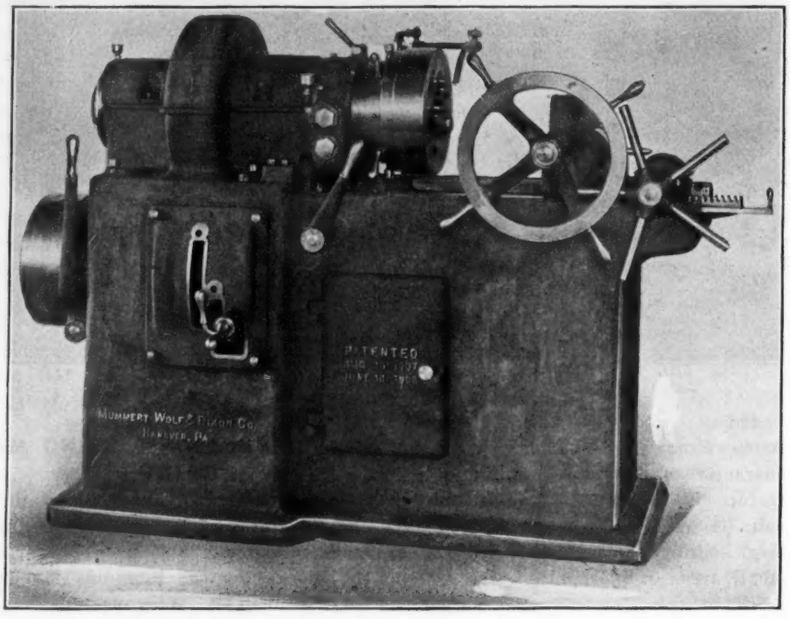


FIG. 1—MUMMERT, WOLF & DIXON PLURALITY HIGH POWER BOLT CUTTER.

The head of the machine is the regular plurality die head made by this company and using plurality dies. The

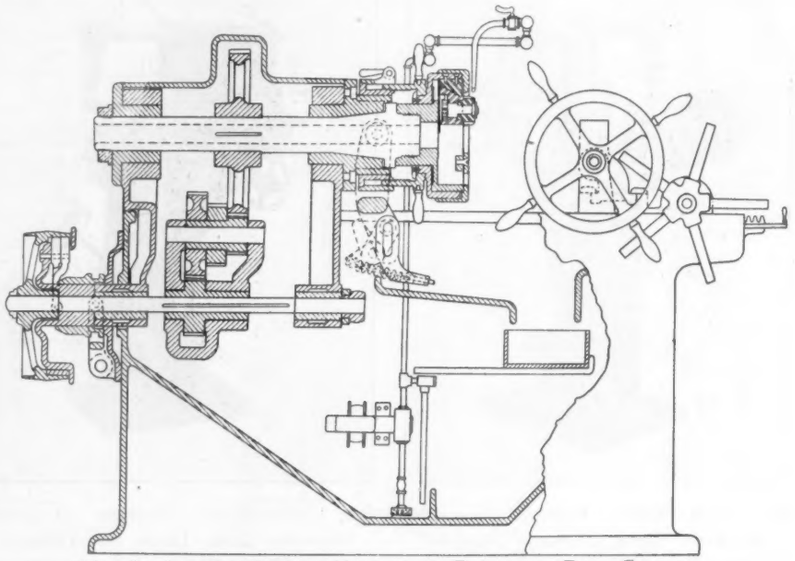


FIG. 2—ARRANGEMENT OF GEARING OF PLURALITY BOLT CUTTER.

head may be opened either automatically or by hand and the dies can be adjusted while the machine is in motion. It is also possible to change quickly from one size to another without removing the dies from the machine. A graduated adjusting ring is provided which permits of setting the dies to cut the required diameter without any trial cuts. The head when closed for threading is positively locked and is as rigid as a solid die.

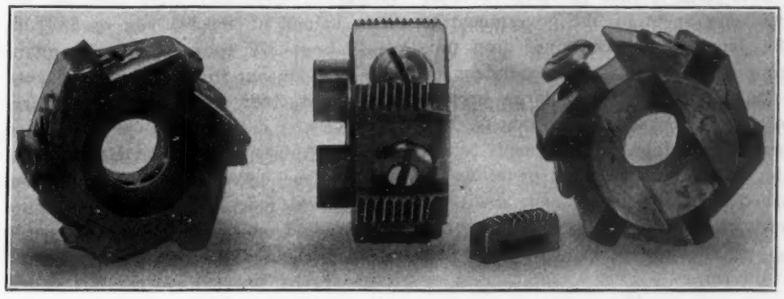


FIG. 3—DIES USED IN PLURALITY BOLT CUTTER.

The vise jaws on the carriage can be adjusted sidewise from the center when any irregularly shaped piece is to be threaded. When in the central position the carriage is locked by a dowel pin. The general appearance of the machine is shown in Fig. 1, while Fig. 2 shows the arrangement of gearing. Fig. 3 illustrates the dies used in this machine, together with an inserted tooth die used for high speed steel cutters.

A Handsome Publication. Joseph T. Ryerson & Son, Chicago, are distributing a very handsome publication illustrating their new warehouse which was described in THE IRON TRADE REVIEW of July 9, 1908. The book comprises about 50 8½ x 11¼-inch pages, and is handsomely printed in colors on highly finished paper. It describes every feature of this immense warehouse, which is built to care for structural material, plates, sheets, bars, fans, machinery, tubes, boiler fittings, rivets and all sorts of specialties of iron and steel. The area of the building is 750,000 square feet, and it has a capacity of 150,000 tons.

An assignment for the benefit of creditors has been made by J. Regester's Sons Co., in a Baltimore court, and Samuel W. and Daniel T. Regester have been appointed trustees upon giving bond for $75,000. The Regester plant in Baltimore was damaged by fire a year ago, and since that time the estate has been involved in litigation.

A NEW SAND BLAST APPARATUS.

The accompanying illustration shows a sand blast apparatus, which has recently been patented and placed on the market by the Curtis & Co. Mfg. Co., St. Louis. The sand hopper is mounted on four structural steel legs, making the apparatus portable. The hopper is open and is supplied with an automatic screen which permits the sand with one shoveling to be taken from the floor or pile, screened, and the gravel, foreign matter, etc. automatically rejected. An air jet automatically removes the dust from the sand as it passes into the hopper. This construction enables sand to be used over and over again, effecting a large saving.

The sand cannot absorb moisture from the compressed air, as the sand does not come in contact with the air from the moment of leaving the nozzle, preventing both gun and hose from being clogged. Either high or low air pressure can be used, although high air pressure is recommended. The air and sand are controlled by the operator at the gun, so that, as soon as the air supply is shut off, the sand ceases to flow and the hose cannot be filled with sand. The sand is drawn slowly through the hose by suction instead of pressure, obviating the necessity of a high priced sand hose.

CURTIS SAND BLAST APPARATUS.

THE PROGRAM OF PAPERS FOR THE INTERNATIONAL CONGRESS OF CHEMISTRY.

The preliminary program of papers for reading and discussion at the meeting of the seventh International Congress of Applied Chemistry in London in May of the present year, has now been issued, and from this official list of papers promised, we have extracted the titles and authors of those which will be of special interest to readers of THE IRON TRADE REVIEW.

Section I.—Analytical Chemistry.—

Henry Sand—A New Apparatus for the Electro-Analytical Separation of Metals—with demonstration.

Prof. Constain—Analytical Methods of Fuel Testing.

Section II.—Inorganic Chemistry and the Allied Industries.

M. Fery—the Calorific Power and Pyrometry of Gas.

M. Charpy—Recovery of the Iron Sulphate and the Acid from Iron-Cleaning Liquors.

M. Lebeau—The Poisonous Gases Liberated by Ferro Silicon.

Section III-A.—Metallurgy and Mining.

Dr. L. Guillet will join in the discussions on (a) Metallography. (b) Thermal Treatment. (c) Welding. (d) Eutectics and present reports on (a) Electro-Metallurgy in France. (b) Treatment of Metallurgical Products. (c) Special Steels.

Dr. R. Adair—The Utilization of Bronze-Nickel as Anti-Friction Metals.

J. G. Stead (F. R. S.)—Testing Steel for Carbon.

Dr. H. Goldschmidt—New Developments of the Thermit Process.

Dr. T. K. Rose—The Electrolytic Refining of Gold.

Prof. Galloway—(a) Changes in the Quality of Coal. (b) Coal Dust.

Dr. C. H. Desch—Eutectic Alloys.

Section X.—Electro-Chemistry and Physical Chemistry.

M. Gin—The Electro Metallurgical Treatment of the Minerals Containing Tungsten Molybdenum and Vanadium. The Electro-Metallurgical Applications of Silicon.

The number of papers promised on the date of issue of this program was 106, but this total is likely to be quadrupled before the date of the meeting. The American committees which have been formed to promote the success of this year's congress, contain amongst others the following:

John Hays Hammond, New York; F. T. Dewey, Washington; H. O.

Hofman, Boston; N. W. Lord, Columbus, O.; T. W. Richards, Bethlehem, Pa.; R. H. Richards, Boston; A. Sauveur, Cambridge, Mass.; T. D. West, Sharpesville, Pa.; W. D. Bancroft, Ithaca, N. Y.; C. A. Doremus, New York; F. A. G. Fitzgerald, Niagara Falls, N. Y.; L. Kahlenberg, Madison, Wis.; G. R. Taylor, Penn Yan, N. Y.; W. R. Whitney, Schenectady, N. Y.

Those who wish to attend the congress and to contribute papers or to join in the discussions, should communicate at the earliest possible date with one of the committee, or write to the general honorary secretary of the congress. Wm. Macneb, 10 Cromwell Crescent, Kensington, London, S. W. The subscription for members is $5. and only those enrolled as members can contribute papers or join in the discussions.

Schedule of Debts.—A statement of the debts has been filed in court by the auditor of the Birmingham Coal & Iron Co., which shows that the company owes unsecured creditors to the amount of $950,000. The heaviest creditors are the Birmingham Trust & Savings Co., $110,000; the First National Bank of Birmingham, $100,000; the Atlanta, Birmingham & Atlantic Construction Co., $429.000; the Consolidated Coal & Iron Co., $13,238.48; Pratt Consolidated Coal Co., $13,890, and the Tennessee Coal, Iron & Railroad Co., $26,502. L. E. Bryant, of Danville, Ky., has a claim of $4,017.

Receiver Resigns.—The report of Receivers H. D. Maze and S. F. McGrew, of the P. P. Mast Co., of Springfield, O., which has just been filed, shows total receipts from Aug. 12, 1908, to date, $270,060.18, which include a cash balance of $16,371.03 and $100.000 in receivers' certificates. The disbursements aggregate $259.985.07, leaving a balance of $10,075.11. Receiver McGrew tendered his resignation and W. F. Foos was appointed his successor.

The workmen at the Hazelton Sheet Steel Co.'s plants at Hazelton, Pa., have refused to accept a reduction of 10 per cent for laborers and have quit work. A cut of 20 per cent in rollers was announced, but the latter have not announced their intentions as yet.

Notice of a 10 per cent reduction in the wages of employes of the New Haven Iron & Steel Co., New Haven, Conn., was posted recently. The mills have not been working very steadily of late.

IRON INDUSTRY IN JAPAN.

Through the courtesy of the United Metal Trades Association of the Pacific coast, Seattle, we are permitted to present the following information on the present status of the iron industry in Japan. The chief fact brought out by these data is that in spite of enormous sums spent by the government to make Japan a self contained iron producing nation, she is still dependent on the outside world for a large proportion of her iron and steel products. This dependence is found at both ends of the scale; Japan imports large quantities of finished iron and steel and also goes outside her own borders for a great deal of the ore smelted in her own blast furnaces.

Mines.

There are but three mines producing iron in Japan at the present time. The production in 1908 was as follows:

Mine and Province—	Output.
Kamaishi—Iwate	36,153 tons.
Sennin—Iwate	4,772 tons.
Abuta—Hokkaido (ores)	18,193 tons.

The iron mines at Kamaishi are said to have been discovered in 1829, and pig iron was produced even before the restoration period. In 1875 they were purchased by the government and worked, but the enterprise, being a failure, was sold to the present owner in 1887; modern machinery was introduced and smelters were established at Sudzuko, Kamaishi and Hashino, Kurihashi-Mura. Sixty-four furnaces with a capacity of 550 tons of iron ore a day are installed and worked in these two smelters. Coke and charcoal works are also established here. For motive power one gas and 32 steam engines are used, aggregating 3,475 horsepower. The number of employes at the mine is 2,256. The product in 1906 was as follows:

	Tons.
Pig iron	32,000
Ferro-manganese	900
Steel	3,200
Coke, about	70,000
Fireproof tiles	1,200

The value of the product was $971,600. The area covered by the Kamaishi mines is 705 acres.

Sennin mines, otherwise known as Amenomiya Sennin mines, are situated in Yuta-Mura and Iwasaki-Mura of Iwate Ken, about 14 miles from Kurozawajiri Station of the Old Japan Railway Co.'s line. The date of discovery is unknown, but the mines existed long before the restoration period (1868); they were purchased by the present owner in 1895 and the plant was completed in 1900.

The mines cover an area of about 350 acres, and employ 70 miners, 824 workmen, carriers and laborers, 20 female laborers and 10 children. Over 60 per cent of these workmen and laborers are employed in manufacturing charcoal and mining lime. For motive power four engines are used, capable of producing 144 horsepower. The total output in 1906 was 4,295 tons of pig iron valued at 180,398 yen or $89,838; and about 577 tons of ferro-manganese. The output for 1904 and 1905 were 2,805 and 3,685 tons of pig iron respectively.

Abuta mines are on the Pacific coast of the Iburi province, Hokkaido, about 19 nautical miles by sea, and 30 miles by land from Muroran. The mines were discovered in 1898, and worked in 1900; for a time they were abandoned, but in August, 1906, the work of mining was resumed, and during the four months ending Dec. 31, 1907, 18,193 tons of iron ore were obtained. No smelting is carried on here; the ores are shipped direct to the Imperial Steel Works at Wakamatsu.

Imports of Iron Into Japan.

The table printed below shows plainly that Japan is not in a position to supply her own requirements of iron ore and pig iron, the imports of ore in 1907 being (271,883,388 pounds) 135,941 tons, and of pig iron (222,304,239 pounds) 111,152 tons. For the first eleven months of 1908 the imports of iron, steel, pig and ingot amounted to (196,111,023 pounds) 98,055 tons, and of iron ore (406,421,001 pounds) 203,-210 tons, the latter showing a very large increase, with the December imports not entered. Most of the iron ore is imported from China.

In addition to iron ore, pig iron, etc., Japan imports considerable quantities of other iron and steel as follows:

Imported Articles—	1907, pounds.	First 11 months of 1908, pounds.
Iron and mild steel bars	238,636,468	209,875,597
Hard steel bars	16,480,190	10,995,643
Galvanized wire	24,905,484	33,595,253
Hoops and bands	2,418,412	3,159,984
Ribbons	2,430,261	877,425
Paragon wire	489,863	187,433
Wire rope	1,801,118	2,141,287
Tinned plates and sheets	16,885,802	32,913,732
Iron or mild steel plates	188,569,176	134,486,392
Hard steel plates	1,086,219	1,183,907
Diagonal or checkered plate	1,399,523	854,636
Galvanized sheets corrugated	37,258,911	17,896,018
Tees, angles, etc	98,988,043	59,859,972
Rails	124,025,538	156,684,572
Fish plates	5,359,878	8,917,158
Cast iron pipe	7,183,216	14,896,210
Wrought iron pipe	44,652,496	30,854,370
Steel pipe	720,395	1,313,348
Scrap and old iron	8,882,650	4,824,372
Ferro-manganese	1,994,149	1,202,300
Spiegeleisen	1,848,877	1,152,473
Iron and mild steel wire	19,734,064	8,973,805

In addition to the above, there are considerable quantities of nails, bolts and

nuts, telegraph wire, chains, etc., and machinery of every description imported, all tending to show Japan's dependence on other countries for manufactured iron and steel as well as iron ore. The table does not include importations for naval and military purposes, entering free of duty and not appearing in the customs returns.

An American expert who investigated the Japanese iron industries reported as follows:

"Kamaishi appears to be the only considerable source of ore, its output being smelted locally, the product amounting to about 40,000 tons of pig iron annually. Outside of Kamaishi and excluding The Imperial Steel Works, there are about 10,000 tons of charcoal pig produced in a number of small isolated furnaces, with ore from local deposits. These and other deposits supply The Imperial Steel Works with from 25,000 to 35,000 tons of ore annually and the balance of this plant's requirements comes from foreign sources. Then, in terms of ore, the Kamaishi mine produces about 70,000 tons and all other Japan about 40,000 tons a year. I do not expect to see any considerable increase over these figures. They may, of course, rise in the course of a few years to 200,000 or possibly 300,000 tons, but even the last figure is insignificant for a country with a population of 50,000,000 people. I have little doubt but that Japan will always be essentially dependent on other countries for its iron ore and will probably continue to be for many years an important importer of pig iron and steel as well."

The Imperial Steel Works.

The Imperial Japanese Government Iron and Steel Works at Wakamatsu, in Kiushiu, was formally opened on Oct. 18, 1901, rather more than 10 years after the first definite proposal of the government to the diet for the establishment of model iron and steel works which would render Japan independent of foreign countries for her supply of iron and steel manufactures. The total amount of the sums appropriated for the establishment of the works amounted to nearly $10,000,000. The area of the works is about 330 acres, including some 82 acres of ground recently purchased for the purpose of enlargement, and not yet built upon. The exact situation is Yawatamachi, Ongagori, Chikuzen province, in the northwestern district of the Island of Kiushiu. It is quite close to Wakamatsu, the chief port for the export of Kiushiu coal, and about nine miles west of Moji, the well known coaling port on the Shimonoseki straits and northern terminus of the Kiushiu Railway. The position was chosen largely on account of its proximity to the Chiku-Ho coal fields, by far the most extensive coal producing district at present known in Japan. This district lies some 30 miles to the south of Wakamatsu in the Provinces of Chikuzen and Buzen, and covers an area of over 300 square miles.

By means of a branch railway, coal can now be carried directly to the works from its own mines at Futase in Chikuzen province, a distance of 30 miles. An extensive addition of machinery is about to be made at this mine, including an electric power house equipped with turbines, surface-condensing plants and pumping machinery, all of British manufacture. The present output from the mines is not sufficient to meet the demands of the works, supplementary supplies being obtained from privately owned collieries at Miike in Chikuzen province, and the Island of Takashima near Nagasaki.

The are two blast furnaces in working order and one in course of construction, to be completed in 1909. The two furnaces now in use produce 300 tons of pig iron in 24 hours. The ore used at the furnaces is hematite, with some magnetite and limonite. About 80 per cent of this ore comes from the Dayton mines near Hankow, in China, under special contract with the Hang Yang Iron Works, owner of the mines.

An irregular supply of hematite ore is obtained from Choren and Katsuzen, in Korea; a contract has recently been concluded for an annual supply of 10,000 tons of limonite ore from Abuta, in the province of Iburi in the Hokkaido (or Yezo), the northern island of Japan. About 12,000 tons of limonite are obtained annually from Yanahara in Mimasaka province, and small quantities from the provinces of Tosa and Buzen.

It is fully realized that the primary object of the Imperial Steel Works cannot be attained while Japan is dependent on foreign countries for the great part of her supply of raw material. Two mines have been purchased at Akadani and Kamo, in Echigo province, and work was commenced in the former some six or seven years ago, but a committee of inquiry reported that the cost of freight to Wakamatsu would render the undertaking a financial loss.

There are three principal departments in the works:

First, the pig iron department, second, the steel department and third, the rolling mill department. Beside these, there are: The electric power plant, central pumping station, iron foundry, repair shop, pattern shop, pattern storage, boiler shop, smithy, chemical and mechanical laboratory and inspection bureau and fire brick plant. The buildings are lighted throughout by electricity. There are at present two Bessemer converters, with a capacity of 150 tons each per 24 hours, one charge amounting to 10 tons. In three years time a third plant will be completed, according to the designs drawn up by the German expert in charge of the Bessemer department. There are now eight Siemens-Martin furnaces with a daily capacity of 300 tons.

Under present conditions the works are able to turn out about 90,000 tons of finished material a year. The original plans were for an annual output of 60,000 tons, which would have satisfied one-half of the demands of that time, but the success of the venture and the steady increase of government requirements have brought about a sensible extension of the original program. In the course of the next five or six years it is confidently expected that the annual output will amount to 180,000 tons; i. e., double the present output. By far the greatest portion of the products goes to the imperial navy department, the remainder being purchased by the war and railway departments.

The number of skilled and unskilled workmen employed at the works is about 7,000, with 3,000 coolies, bringing the total number of employes up to 10,000. The daily wages paid vary from 9 cents to 90 cents. In addition to the buildings already mentioned there are two hospitals about a half mile distant from the works. Both are equipped with fully qualified medical staff and modern appliances. At present there are 300 wooden structures for the residences of workmen, and 1,500 are being built. According to a three year's program, the total number of dwelling houses is to be 3,000.

Car building has been resumed at the plant of the Standard Steel Car Co., Butler, Pa., after a shut-down of nine months. The Butler Bolt & Rivet Works, a subsidiary plant, has also been put in operation.

The annual meeting of the International Harvester Co. will be held April 15, before which time, officers say, the annual report will not be ready.

Little Permanent Gain Noted

While the general tendency of the market the past week was upward yet the gain as a whole was not appreciable. The general volume of investment purchases has shown a gradual and steady falling off, thus making plain the fact that the public continues to show apathy toward the market.

Monday's opening was moderately active, and the close was firm and higher. All grades of copper metal advanced ⅛ cent a pound in New York and were also higher in London. After Tuesday's firm opening there followed a decline, and the close was weak. Copper metal advanced ⅛ cent a pound. Moderate activity characterized Wednesday's market, and the close was higher. Extreme dullness on Thursday led to insignificant price fluctuations. Friday was the dullest day of the week, but prices were steady to firm. Copper metal was again advanced ⅛ cent. Saturday's market was quite buoyant, but prices were firm, closing at the highest of the week.

Call money ranged from 1½ to 2 per cent throughout the week, and time money was liberally obtainable at a slightly higher basis of rates. Additional gold was shipped on Tuesday to London to the amount of $5,300,000, this bringing the aggregate shipments since the first of the year up to $31,000,000. Further gold engagements were reported on Tuesday and Wednesday. The Bank of England rate remained unchanged at 3 per cent, but it is expected that the rate will be reduced to 2½ per cent possibly April 1. The Jones & Laughlin Steel Co. announced the sale of $15,000,000 in bonds to Chicago and New York houses to furnish the means for carrying out development plans. Idle car figures showed a decrease of 8,507 in the past fortnight. Commercial failures for the week were 269, compared with 249 the preceding week and 342 the corresponding week last year. The New York bank statement showed a total of loans decreased $3,033,300; deposits decreased, $3,066,400; cash increased, $1,106,600. The surplus reserve increased $1,873,200, thus bringing the total surplus reserve up to $17,406,650, compared with $50,921,525 a year ago. Shares were sold to the number of 3,155,860, compared with 2,670 920 the preceding week and 4,673,350 the corresponding week last year. Bonds exclusive of government bonds were sold to the amount of $12,403,000, compared with $16,039,000 the preceding week and $17,990,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Mar. 27	Changes in Week	Date 1909 Ann.	M't'g.	Stock Outstanding	Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	14⅜	+1⅜	Sept.	2	$19,820,000		.....	.....
Allis-Chalmers pr	44⅞	+1¾			16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	8⅛	.....	Feb.	2	41,233,300		.....	.....
Am. Car & Foundry	74⅝	+⅝			41,233,300	7 cum	1¾ Q.	Jan., 1909
Am. Can pr	49½	+1⅜	June	24	30,000,000		½ Q.	Jan., 1909
Am. Car & Fdy pr	110	— ¾			30,000,000	7 n. c.	1¾ Q.	Jan., 1909
American Loc	54¼	+3¼	Oct.	19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	114	+2½			25,000,000	7 cum	1¾ Q.	Jan., 1909
American Ship	58⅞	.....	Oct.	13	7,600,000	4	1 Q.	June, 1908
American Ship pr	105	+1			7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new)	38¼	+2⅞	Dec.	2	17,184,000		.....	.....
Am. Steel Foundries, pr	47½	.....			17,240,000	6 cum	1	Aug., 1904
Barney & Smith	40	.....	June	1	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith, pr	95	.....			2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	22	+ ⅜	April	6	14,862,000		.....	.....
Bethlehem Steel, pr	49	.....			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	34½	+ ½	March	16	45,000,000*	6	1½ S. A.	Feb., 1909
Cambria Iron	46¼	.....			8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	20½	—1½	Feb.	15	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	34	+2	Oct.	18	34,235,500		3½	April, 1902
Crucible Steel	7	.....	Oct.	20	24,578,400		.....	.....
Crucible Steel, pr	58	+ ½			24,436,500	7 cum	1 Q.	Mar., 1909
Empire Steel	6	.....	April	27	1,254,770		.....	.....
Empire Steel, pr	46	.....			2,500,000	6 cum	1½ S. A.	Jan., 1909
Fay & Egan	95	.....	Feb.	18	1,000,000	6	1¾ Q.	Nov., 1908
Fay & Egan, pr	125	.....			1,000,000	7 cum	1¾ Q.	Nov., 1908
General Electric	158	+4½	May	11	65,178,800	8	2 Q.	Jan., 1909
Harbison-Walker	17	.....	Jan.	18	18,000,000		½	Oct., 1907
Harbison-Walker, pr	80	.....			9,600,000	6 cum	1½ Q.	Jan., 1909
International Pump	37½	+ ⅞	June	8	17,762,500		1	April, 1905
International Pump, pr	84⅜	— ⅜			11,350,000	6 cum	1½ Q.	Feb., 1909
Lackawanna Steel	30	.....	March	10	34,971,400		.....	.....
Lake Sup. Corp	18¾	+ ¼	Oct.	6	40,000,000		.....	.....
New York Air Brake	84½	— ⅝	June	17	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	6	1½ Q.	Mar., 1909
Niles-Bement-Pond, pr	100	.....			2,000,000	6 cum	1½ Q.	Feb., 1909
Otis Elevator Co	49	+1	March	15	6,375,300		1½ S. A.	April, 1909
Otis Elevator Co., pr	94	+1			6,295,000	6 n. c.	1½ Q.	April, 1909
Penn. Steel	50	.....	May	10	10,750,000		.....	.....
Penn. Steel, pr	103	.....			16,500,000	7 n. c.	3½ S. A.	Nov., 1908
Pittsburg Coal Co	10¼	.....	March	9	28,104,600		.....	Nov., 1906
Pittsburg Coal Co., pr	43	+ ½			27,071,800	7 c.	1¾	April, 1905
Pressed Steel Car	37	+ ¾	Feb.	17	12,500,000		3	Aug., 1904
Pressed Steel Car, pr	98	+ ¾			12,500,000	7 n. c.	1¾ Q.	Feb., 1909
Pullman	172	+1⅞	Nov.	10	100,000,000	8	2 Q.	Feb., 1909
Railway Stl. Spring	36⅞	+ ⅜	March	4	13,500,000	4	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	99	—1			13,500,000	7 cum	1¾ Q.	Dec., 1908
Rep. Iron & Steel	21	+ ½	Oct.	20	27,191,000		.....	.....
Rep. Iron & Steel, pr	71⅞	+1⅜			20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	72	.....	March	10	10,000,000	5	1¼ Q.	Mar., 1909
Sloss-Sheffield, pr	108	.....			6,700,000	7 n. c.	1¾ Q.	April, 1909
U. S. Pipe & Fdy	29	+2	June	23	12,500,000	4	¼ Q.	Dec., 1907
U. S. Pipe & Fdy., pr	72	+2			12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	46⅛	+2⅝	April	19	508,302,500	2 n. c.	½ Q.	Mar., 1909
U. S. Steel, pr	111⅝	+1⅝			360,281,100	7 cum	1¾ Q.	Mar., 1909
U. S. Steel 5s	102¾	— ⅛			463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	57	.....	Sept.	21	9,073,680		.....	.....
Westinghouse Elec	81¾	+2¾	June	16	27,173,200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	108	+1	Oct.	5	14,000,000*		2½ Q.	April, 1909

Par value of shares, $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 79¼, a net gain of 6.

Boston.—Butte Coalition closed 24⅞, a net gain of 2¼; Calumet & Arizona closed 102, a net gain of 2; Calumet & Hecla closed 620, no change; North Butte Mining closed 72¼, a net gain of 4⅜; Quincy Mining closed 48, a net gain of 3.

Financial Notes.

Manning, Maxwell & Moore, Inc., declared a regular quarterly dividend of 1½ per cent, payable April 1; the Pullman Co., the usual dividend of 2 per cent, payable May 16; the Pittsburg Malleable Iron Co., the quarterly dividend of 2½ per cent, payable April 20; the American Locomotive Co., the usual quarterly dividend of 1¾ per cent, payable April 23; the Vulcan Detinning Co., the regular quarterly dividend of 1¼ per cent on preferred, payable April 20.

Southern Steel Appraisement.—Appraisers of the properties of the Southern Steel Co. have filed the following estimates: Real estate holdings, $3,880,468.30; buildings, $234,075; dwellings, $191,505; equipment, $3,090,060; supplies, $216,926.59; merchandise, $40,066.02; livestock, $21,280; total, $7,674,380.91. The petition of the Schuler interests to have an upset price fixed before the sale of the property has been denied in federal court, the judge declaring that he will not allow interference with the sale on April 12 unless sufficient bond be given.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Automatic Starter Co., 920 Republic building, Chicago, to manufacture machinery, has been chartered with $50,000 capital stock by Max Selle, Odilon Brisbois and Hugo M. Friend.

A charter has been granted to the Mount Holly Iron Works, Camden, N. J., to manufacture iron and steel, with $10,000 capital stock. The incorporators are: John A. MacPeak, F. R. Hansell and Robert M. Johnson.

The Lebanon Steel Co., Lebanon, Pa., with $300,000 capital stock, has been incorporated by Griffin C. Callahan, Jacob E. Gegenheimer, James C. McAndrews, James Hoy Sims and John M. Wirgman, all of Philadelphia.

The Griswold Garage & Machine Co., Port Jefferson, N. Y., merchant engineer, tool maker, brass founder and boiler maker, capitalized at $20,000, has been incorporated by Fred C. Griswold, Luther H. Chambers, Frank C. Dildine and John B. Overton, Port Jefferson.

The Gould Specialties Corporation, New York, has been granted a charter to manufacture machinery, engines and mechanical devices, with $60,000 capital stock. The incorporators are: Robert M. Stephens, Hackettstown, N. J.; Theron A. Gould, Newark; and John B. Wentworth, 32 Union Square, New York City.

The Taylor Safety Rail Joint Co., Pine Bluff, Ark., has been incorporated to manufacture a safety rail joint patented by P. B. Taylor, who is president of the company, A. A. De Laurin is vice president, L. T. Sailee is secretary and A. W. Troup is treasurer. The company is capitalized at $25,000.

Articles of incorporation have been filed by the Power & Illuminating Engineering Co., Alliance, O., electrical machinery, with $25,000 capital stock. Those interested are: H. H. Hosford, Grant Snyder, J. H. Forbush, A. L. Rechert and Allen Kirkbridge.

The No-Ke-Lock Co., Wilkinsburg, Pa., has been granted a charter at Dover, Del., to manufacture, sell and deal in keyless locks of all descriptions. The capital stock is $250,000, and the incorporators are: R. E. Cook and J. F. Balsley, of Wilkinsburg, Pa., and C. A. Smith, of Pittsburg.

The Southern Shovel & Mfg. Co., Gadsden, Ala., has filed articles of incorporation, with a capital stock of $50,000. The principal offices of the new corporation will be in Gadsen, and the directors are as follows: Thomas H. Morris, Isaac Haas, Sidney Marks, Edmund Marshal, C. P. Smith, E. T. Hollingsworth, W. G. Bellenger. The directors elected these officers for one year: Thomas H. Morris, president; Isaac Haas, vice president, and Ed. J. Marshall, treasurer.

Articles of incorporation have been granted to the Golden Klein Iron Works, New York City, for the purpose of fabricating structural and ornamental iron work with $3,000 capital stock. The incorporators are: James J. Golden and Bernard F. Golden, 508 Pearl street; Jacob Klein, 47 St. Nicholas avenue, all of New York City.

The Galvin Regulating Radiator Co., Buffalo, N. Y., has been incorporated to manufacture hot air furnaces and appliances, steam and hot water radiators and boilers, with $100,000 capital stock. Among those interested are: Frank P. Galvin and Harry C. Glain, 15 Crescent avenue, and Wilbur C. Grandison, 78 Erie County Bank building, all of Buffalo.

New Construction:—

The Essmueller Mill Furnishing Co., St. Louis, Mo., has moved its machine shops and offices to new quarters at 1216 to 1224 South Eighth street.

The Belmont Stamping & Enameling Co., New Philadelphia, O., is planning to erect an addition to its plant, 80 x 150 feet, which is made necessary by the increase in business.

The George W. Diemer Mfg. Co., Chicago, sheet metal worker, has let the contract for a factory building at Kinzie and Monticello streets, three stories, 100 x 125 feet, of brick, mill construction.

The Carnahan Stamping & Enameling Co., Canton, O., has let the contract for the erection of a building to be used as a warehouse and shipping room, 175 x 272 feet, fire proof construction, with saw tooth roof.

The Manistee Iron Works, Manistee, Mich., has purchased an old mill site on Manistee lake with a half mile of dockage and tracks, and will extend the works to the north side. The company will develop a newly invented marine steam pump.

The Mayo Life Boat Co., Erie, Pa., is installing additional machinery in its plant on West Eighteenth street, for the manufacture of various kinds of sheet metal products, in addition to the manufacture of the new model unsinkable life boats. The plant comprises a main machine shop 60 x 150 feet, and a second building, two stories, 24 x 28 feet, with drafting room, blacksmith shop and boiler shop, etc.

The National Enameling & Stamping Co. is completing two large brick buildings at its Granite City, Ill., plant, to be used for the special manufacture of brilliantine enameled ware. The new plant will add about 100 additional employes to the company's force.

The La Crosse Plow Co., La Crosse, Wis., has decided to erect a foundry building 300 feet long, 80 feet wide and 18 feet high on the Second street frontage of the company's properties. The work of construction will begin some time during the middle of the summer.

Additions which were being made by the Riter-Conley Mfg. Co., at the Sharon, Pa., plant of the National Malleable Castings Co. are being completed, and will be ready for operation in about two weeks. The improvements will add store room and facilitate the shipping of finished products.

The Union Tool Co., Coalinga, Cal., advises that its proposed new building will consist of forge and machine shop, that it will manufacture oil well tools, etc., and will employ 20 to 30 men. Machinery, including steam hammers, lathes, drill presses, planers, etc., has been contracted for.

W. J. Savage & Co., Knoxville, Tenn., are planning to erect an addition to the plant two stories, 80 x 125 feet, and to install additional machinery for the manufacture of specialties. The contract for the additional machinery has been placed.

The Moline Plow Co. has had plans drawn for a foundry 80 x 208 feet, at Stoughton, Ill., for the Mandt Wagon Co., a subsidiary of the Moline company. It is said that the foundry building will cost approximately $20,000. Castings will be turned out for use in the manufacture of agricultural implements.

The American District Steam Co. is considering plans for a machine shop to be built at North Tonawanda, N. Y., in connection with its plant twice the size of the one first planned to replace that destroyed by fire last summer. The revised plans will be submitted to the board of directors, and a meeting will be held at Lockport, April 13.

Frank Wyatt, of the Wyatt Mfg. Co., Salina, Kas., has announced that he will shortly begin the erection of a building two stories, 50 x 120 feet,

fire proof, to cost about $12,000. The lower floor will be used for an office and foundry, and the second floor for a pattern shop. Construction of the building will begin about May 1.

The Granite City Steel Keg Co., Granite City, Ill., will shortly begin the erection of a plant on five acres of ground. The main building will be 100 x 200 feet, two stories high, of steel and concrete. Four other buildings of smaller size will also be built. The entire output of the plant will be employed by the National Lead Co. in packing and shipping its product.

The Standard Steel Car Co. has had plans drawn for a five story office building, to be built at Butler, Pa., some time in the summer, at a cost of $100,000, in which the drafting room and other departments will be installed. The building will be of steel and brick construction. The general offices of the company will, however, still be maintained at Pittsburg.

Work on the new foundry and machine shops of the Billings Foundry & Machine Co., Billings, Mont., will be started April 1., according to J. C. O'Donnell, one of the leading stock holders. At first two buildings will be constructed, one 40 x 90 feet, two stories, and the other 40 x 90 feet, one story. On the installation of machinery, probably $50,000 will be invested. It is expected that the company will be ready for business by June 1.

The Aurora Automatic Machinery Co., Aurora, Ill., advises that it is erecting in Chicago at 1307 Michigan avenue, a building to be used as a sales department for the company's "Thor" pneumatic tools, gasoline motors, and motor cycles. The building will be two stories, 25 x 160 feet. The first floor will be fitted as a sales room, and the second floor will be made into spacious suites of offices for the officers of the company for conducting sales.

The Emerson Engine Co. Inc., Alexandria, Va., advises that it has incorporated for the purpose of building engines. Its present plant has a capacity of from 35 to 40 engines per week of the smaller type, and two engines per week of the 100 to 250 horsepower type. It is in the market for crank shafts, hexagon and square steels, additional machine tools, castings, brass goods, such as lubricators, oil devices in sufficient quantity to equip 500 engines. Victor L. Emerson is president and treasurer, and H. E. Jenkins is vice president and secretary of the company.

The Geuder, Paeschke & Frey Co., Milwaukee, well known enameled ware concern, which recently increased its capital stock from $150,000 to $1,000,000 and changed its corporate name from the Geuder & Paeschke Mfg. Co. to the Geuder, Paeschke & Frey Co., has planned extensive additions and improvements to its large plant. Property adjoining the plant on the east has been purchased and a three-story plant, 200 x 200 feet, will be erected at a cost of not less than $50,000. The entire Milwaukee establishment when completed, will cover an area of 12 acres. A site has also been purchased in Chicago for the erection of a new plant in that city where a six-story structure will be built.

General Industrial:—

The Columbus Automatic Tool Co., Columbus, O., has increased its capital stock from $70,000 to $100,000.

The Kramer Bros. Foundry Co., Dayton, O., has received a large order of cement tools from Berlin, Germany.

The Columbus Malleable Castings Co., Columbus, O., has increased its capital stock from $250,000 to $300,000.

An increase in capital from $50,000 to $100,000, has been certified to by the J. D. Smith Foundry Supply Co., Cleveland.

The Phillemac Rolling Mill Co., Cincinnati, has increased its capital stock from $45,000 to $75,000 to provide for the extension of its business.

A petition to have Rufus D. Pace, a foundryman and real estate dealer of Sycamore, Ill., declared bankrupt, was filed in the federal court in Chicago recently.

The Massillon Iron & Steel Co., Massillon, O., was awarded the contract for furnishing cast iron pipe to the Canton, O., water works on its bid of $27.50 a ton, which is $2 higher than last year.

The Seaboard Steel Castings Co. Chester, Pa., has received a contract to make a steel stem post for the Italian steamer Florida, which was badly damaged recently in its collision with the steamship Republic.

The Acme Foundry Co., Detroit, gray iron castings, advises concerning its recent increase of capital stock from $10,000 to $25,000 that it will neither enlarge its plant nor buy new equipment for the present.

The Morgan Engineering Co., Alliance, O., has completed a three-high plate mill for the Otis Steel Co., Cleveland, which will roll steel plates 152 inches wide. Each of the eight pieces used in its construction weighed 50 tons.

The Wetherill Bros. Machine Co., Chester, Pa., has received a contract from the St. Louis Gravel & Sand Co. for building a 12x22x14 feet cross-compound direct-connected engine and hydraulic pump. Part of the additional machinery is a steel agitator and drive, which will drive a pair of 8x8 double engines. The machinery will be employed in reclaiming sand and gravel from river bottoms.

The Wisconsin Bridge & Iron Co., Milwaukee, has secured an order from the Chicago, Milwaukee & St. Paul Railway for 300 tons of plate girder construction and it is rumored that the railway will soon place another order for an additional 600 tons.

The Fort Pitt Forge Co., Pittsburg, advises in respect to its recent fire that the damage was confined to the machine shop, store and shipping rooms. Its riveting machinery was not damaged in any way, and is now running as usual.

The Federal Steel Foundry Co., Chester, Pa., has notified its men of a reduction in wages of 10 per cent, which went into effect March 20. The company has decided to run the plant 60 hours each week instead of 50 hours as at present.

The Joliet Bridge & Iron Co., Joliet, Ill., has called a meeting of the stockholders for April 15, to consider a proposal to increase the number of directors from three to five, to elect a new board, and to consider plans for enlarging the plant.

The Globe Iron & Foundry Co., Morrisville, a suburb of Johnstown, Pa., ran its first heat after 18 months of idleness on March 6. The company has received a large order from the Cambria Steel Co., for journal boxes and car frictions, which has brought about the resumption of work.

The Schoonmaker Mechanical Motor Power Co., 132 Nassau street, New York City, advises respecting its recent incorporation that it expects to manufacture and lease on royalty, but not with exclusive rights, only in lines where it does not intend to compete or manufacture itself.

The Eclipse Machine Co., Elmira Heights, N. Y., for some time past has been running 14 hours a day, and finds itself unable to keep up with its orders, so that it has been forced to refuse business. The company manufactures automobile engines parts and accessories as well as bicycles.

The Akron Automatic Hot Water Co., Akron, O., advises respecting its recent incorporation that as yet it has not had time to organize thoroughly. So far, no decision has been reached as to building, and it will have its heaters made in the meantime by contract until the expected business justifies expansion.

The Ernst Wiener Co., New York City, dealer in railroad specialties for

all industries, reports that business appears to be improving judging from the number of inquiries as well as orders recently received, not only domestic but export business as well. Among the orders recently taken is a large one for the complete equipment of a narrow gage railroad in Colombia, S. A., including over six miles of track, switches and a number of freight and passenger cars, as well as two locomotives.

At the meeting of the stockholders of the Maryland Steel Co., a subsidiary of the Pennsylvania Steel Co., these officers were re-elected: President, E. C. Felton; treasurer, E. W. Smith; secretary Frank Penny, all of Philadelphia.

The Milwaukee-Reliance Boiler Works, Milwaukee, which was recently incorporated by Sharp Bros., proprietors of the Reliance Boiler Works, advises respecting its incorporation, that it does not contemplate any changes in building machinery or output, and the management will remain exactly the same as heretofore.

The stockholders of the Columbus Structural Steel Co., Columbus, O., at their recent annual meeting, reelected as directors, O. M. Blose, W. E. W. Cherry, Henry Richter, Joseph Schonthal, D. W. McGrath, Conrad Born and B. M. Freeman. The former officers were re-elected. The reports received showed that while the year's business had been affected by the depression, yet on the whole it was satisfactory.

The William P. Collins Co., Borden avenue and Creek street, Long Island City, N. Y., advises respecting its incorporation recently noted that the company was formed to take over the business conducted under the style of the Collins Iron Works, which formerly was located at Twenty-first street and North river, New York City, but for the past six years has been located at the above address. The company builds boilers, tanks, smoke stacks, and like plate work.

The Coyle Mfg. Co., 2300-04 North Broadway, St. Louis, mill-wright and machinist, advises respecting its incorporation recently noted, that it was organized by Thomas M. Coyle as president and general manager, whose associates are John C. Rader, secretary and treasurer, and W. Scott Hancock. The company proposes to continue along the same line of manufacture as its predecessor, the Maheu & Coyle Mfg. Co., building elevating, conveying and power transmitting machinery as a specialty, as well as a general repair trade in the machine, wood and sheet iron manufacturing business

The Funk Machine Co., 23-27 City Hall Place, New York City, advises that it has succeeded to the business of Nelson E. Funk, that it will largely increase the plant and will continue the manufacture of book binders' and printers' machinery. No new building will be done at present, but more machine tools will be purchased from time to time as business develops.

The Wrightsville Hardware Co., Wrightsville, Pa., advises that the press reports of its recent fire were exaggerated, only its tinning, polishing and core department being destroyed. Temporary quarters were immediately provided for these departments. The company is planning to rebuild immediately, and will require in new equipment, polishing, grinding and exhaust blowing apparatus.

Secretary Arthur L. Wilkinson, of the Ohio Brass Co., Mansfield, O., is quoted as saying that there has been material improvement in the business of the company in the past few weeks. A $40,000 order was received for valves for the United States Radiator Co., and a $50,000 order for railroad bonds for the Rock Island, and an order for 40,000 high tension insulators from the Vancouver Power Co.

At the annual meeting of the Temple Iron Co., Reading, Pa., these officers and directors were elected: President, George F. Baer; vice president, A. F. Law; James S. Harris, of the Reading railroad; E. B. Thomas, of the Lehigh Valley; F. D. Underwood, of the Erie; Albert Broden, of the Reading Iron Co.; J. W. Truesdale, of the D. L. & W.; Thomas P. Fowler, of the N. Y. O. & W.; F. C. Smink, of the Reading Iron Co., and W. J. Richards.

The Rutan Triple Duplex Valve Co., Elmira, N. Y., of which A. N. Rutan is president and G. A. Gucker is secretary, and which was recently incorporated, announces that it manufactures the only known valve which closes both the supply and exhaust at the same time and also has one valve open and port through valve the full size of the pipe used in connecting up. Thus the valve has no resistance on pressure while fully applied.

The Paris Foundry & Machine Co., Paris, Ill., and the Modern Concrete Machine Co., of Terre Haute, Ind., have united with a capital of $100,000, and incorporated under the style of the Modern Foundry & Machine Co., with main offices at Paris, Ill. It is proposed to enlarge the present plant at Paris, and add machinery to the foundry, machine shop and pattern shop. The Paris plant will continue along its former lines of manufacture, including corn threshers, broom corn bailers, broom making machinery, gray iron castings and concrete block machines. A cast iron welding process will be offered to the trade in a short time. The officers of the new company are: President R. M. Mason; secretary-treasurer, B. R. Simmons; vice president, P. A. Bowsher.

The Augustine Automatic Rotary Engine Co., 132 Northampton street, Buffalo, whose incorporation was announced some time since, advises that it ran two of its new engines at the Buffalo motor boat show, one of them a 20-horsepower and the other 125-horsepower, off the steam radiator system with about five pounds pressure, the engines being located 300 feet from the low pressure boiler. Its biggest engine will turn over with only one pound of steam pressure. It is now supplying a number of sizes to the market.

W. P. Pressinger, who recently resigned as manager of the compressor department of the Chicago Pneumatic Tool Co., has organized the W. P. Pressinger Co. to handle vacuum cleaning machines, both stationary and portable, made by the Keller Mfg. Co., Philadelphia, formerly sold by the Chicago company. The Pressinger company has opened offices and sales rooms at No. 1 West Thirty-fourth street, New York City, and will establish local agencies throughout eastern territory.

The Robertson Drill & Tool Co., 1848 Niagara street, Buffalo, whose incorporation was recently noted, advises that it has leased the building where it is located at present, and does not anticipate building for some time. It is equipping to manufacture Robertson's line of Royal power hack saws and motor drill presses. Since being incorporated, the capital stock has been subscribed and the following officers have been elected: President, W. Robertson; vice president, E. L. Worbois, and secretary-treasurer, S. A. Benedict.

The old Miles Greenwood Foundry, which began operating in the early 30's at Canal and Walnut streets, Cincinnati, will be torn down shortly in preparation for the building for the proposed Ohio Mechanics' Institute. In the early days, it was one of the most noted plants west of the Alleghenys, and employed 700 men. During the Civil War, the owner turned the foundry into an arsenal, making cannon, rifles and equipment

for the government. Mr. Greenwood was the founder of the Ohio Mechanics Institute, and died more than 20 years ago.

Trade Notes:—

Announcement is made that the Rockwell Furnace Co., 26 Cortlandt street, New York City, has purchased the foundry, drawings, patterns, etc., of the Rockwell Engineering Co., and the business will hereafter be transacted under the name of the Rockwell Furnace Co. All customers of the Rockwell Engineering Co. are assured prompt fulfillment of all orders for repair parts, etc.

Announcement is made that the manufacture and sale of the Cope's feed water regulators and the Cope's pump governors will be carried on by the Northern Equipment Co., Chicago, with which has been consolidated the American Boiler Economy Co., of New Jersey, with offices in Philadelphia. The main office of the new company will be located in the Old Colony Building, Chicago, while branch offices will be continued as before in the Tribune Building, New York City; the Oliver Building, Boston; 226 East Pleasant street, Baltimore; Frick building annex, Pittsburg; while a new branch office will be opened in the North American Building, Philadelphia. The management will continue unchanged. The obligations of the American Boiler Economy Co., including guarantees with five years of the date of purchase, have been assumed in full by the Northern company.

Fires:—

The plant of the Wright Wire Co., Worcester, Mass., was seriously damaged March 20, the loss being placed at $8,000.

The machine shops of Herman Broesel, New Brunswick, N. J., were badly damaged March 20, causing a loss of probably $75,000.

The plant of the Stewart Machinery Co., Winnipeg, Manitoba, was damaged March 19, to the extent of $15,000, fully covered by insurance.

Four enameling ovens in the building of the Iron City Sanitary Mfg. Co., Zelienople, Pa., were badly damaged March 22, the loss being placed at $8,000.

Considerable damage was recently done to the iron clad building of the Burnham Foundry Co., Milwaukee, occupied by the Central Foundry Co. The loss was fully covered by insurance.

The foundry of the El Reno Foundry & Machine Co., El Reno, Okla., was seriously damaged March 13, the loss being placed at $2,500, with $1,000 insurance. Steps will be taken to rebuild the foundry at once.

TRADE PUBLICATIONS.

DRAWING INSTRUMENTS—The Keuffel & Esser Co., New York, has just published the thirty-third edition of its catalog, which is the largest it has yet issued. It comprises about 550 6 x 9-inch pages, handsomely illustrated and well bound. It lists every conceivable instrument and material which can be of service in the drafting room, together with a complete line of surveyors' tools. An important change in the general arrangement of the catalog has been made by creating a special section for drafting office furniture, which is now forming an important department among the goods manufactured by this company. The catalog will be sent free to engineers on application.

GAS ENGINES.—A 35-page, 6 x 9-inch catalog is being distributed by the Du Bois Iron Works, Du Bois, Pa., and describes the Du Bois single-cylinder tandem and twin tandem gas engines. These engines, which are arranged to operate on natural, illuminating and producer gas, are built in a number of types for general and electric power service and operate on the four-stroke cycle. The catalog shows illustrations of the various parts of the engine, together with completed installations of engines and producer plants, and thoroughly describes the various constructive features of the machines.

TRANSFORMERS.—The General Electric Co., Schenectady, is distributing Bulletin No. 4640, devoted to large transformers in which are given some of the more important points regarding the relative merits of the different types of large transformers manufactured by this company. Oil cooled, water cooled and air blast transformers of large capacity are described and illustrated. The bulletin also contains information intended to assist a customer in determining whether air blast or water cooled transformers will be more suitable for a given service.

RIVETING MACHINERY.—Catalog No. 10 has just been issued by the Chester B. Albree Iron Works, Allegheny, Pa. It comprises 83 6 x 9-inch pages, and, in addition to describing and illustrating a very full line of hydraulic and riveting machinery built by this company, contains considerable information of value concerning riveting. It gives a number of tables showing strength of riveted joints, and diagrams relating to various riveting problems.

AIR COMPPRESSORS.—The Ingersoll-Rand Co., New York, is distributing a pamphlet describing Imperial type, duplex steam-driven compressors. The pamphlet comprises 16 pages devoted to the constructive details of the machine, illustrations of parts and tables of capacity. The machine is built to furnish from 123 to 3,408 feet of free air per minute. This company is also distributing another pamphlet describing air receivers, pressure tanks and moisture traps.

PORTABLE CRANES.—A small folder is being distributed by William S. Nicholls, 253 Broadway, New York., describing the Hercules portable crane hoist, which is built in four sizes with capacities of from 500 to 3,000 pounds.

ENGINES AND BOILERS.—The Atlas Engine Works, Indianapolis, is distributing its 1909 general catalog. This is a book 8¼ x 10½ inches, containing 95 pages. The first half of the book is devoted to Atlas products, including high speed and Corliss type steam engines, gas and gasoline engines, water tube and horizontal tubular boilers, semi-portable boilers and engines and portable boilers and engines. The last half of the book comprises considerable information drawn from the works of standard authorities, and includes a discussion on heat as a form of energy, data on boiler and engine performances, data on steam, including steam tables, notes on engine and boiler horsepower, including an explanation of the indicator card and the method of figuring steam consumption from the card, rules for the care and management of boilers, chimney and smoke stack tables and formulae data on the strength of materials, flow of water in pipes, weights and measures, etc.

SHAPERS.—The 1909 catalog of Gould & Eberhardt, Newark, N. J., describes the line of shapers manufactured by it. The catalog is 9 x 6 inches in size and comprises 50 pages. It describes the full line of shapers built by this company, ranging in size from 14 to 34-inch, giving illustrations and specifications of completed machines. Considerable space is devoted to descriptions of details of construction, together with notes on the use of the various attachments. In addition to the regular line, high duty, motor-driven shapers are described. Information of considerable value is comprised under the heading, "The Shaper as a Manufacturing Tool." This section shows a number of difficut jobs which can be done on the shaper, the illustrations showing methods of mounting the work and using the machine.

CONCRETE REINFORCING MATERIAL.—The General Fireproofing Co., Youngstown, O., is distributing a 48-page, 6 x 9-inch catalog describing bar, mesh and fabricated reinforcement for concrete work. The catalog shows the various types of reinforcing material manufactured by this company and gives data on the various sizes. Illustrations of buildings in which the various systems have been used are presented, together with general notes on the methods of calculating spans and stresses. Valuable tables are included in the catalog, showing sizes and spacing of different types of reinforcing with various sized slabs.

STOKERS.—The Taylor stoker, manufactured by the American Ship Windlass Co., Providence, R. I., is described in a handsome 40-page catalog, which has just been issued. The construction of the stoker, which is of the underfeed type, is described and illustrated, both by means of line drawings and half tones. This machine has had a remarkable record for economy in all places where it has been installed, its construction being such that volatile gases distilled from the green fuel are intimately mixed with hot air and then caused to pass through the incandescent coke bed, resulting in absolutely smokelessness and high operating economy. The catalog describes the operation and presents results showing economy and costs of operation of this type of stoker. Diagrams are presented, showing its method of installation under various types of boilers.

GRINDING WHEELS AND MACHINERY.—A 170-page catalog, 6 x 9 inches, has been issued by the Norton Co., Worcester, Mass. It briefly describes the process of manufacture of grinding wheels by this company, and then presents tables showing grinding wheel speeds, horsepower required to drive, etc. It explains the terms, grain and grade of material, and presents tables for the selection of grades. Following this is a price list of wheels of various sizes and shapes, and then nearly 100 pages illustrating various types of wheels made by the company. The remainder of the catalog comprises descriptions of various special products, including alundum sticks, rubbing and sharpening stones, oil stones, etc., together with a brief description of Norton grinding machinery.

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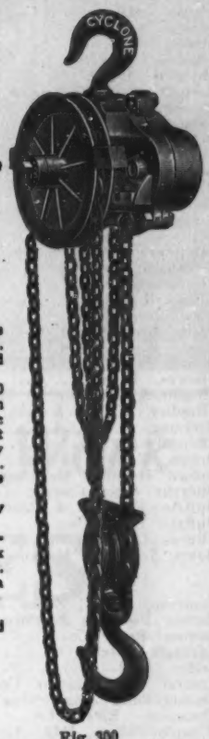

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Fig. 300

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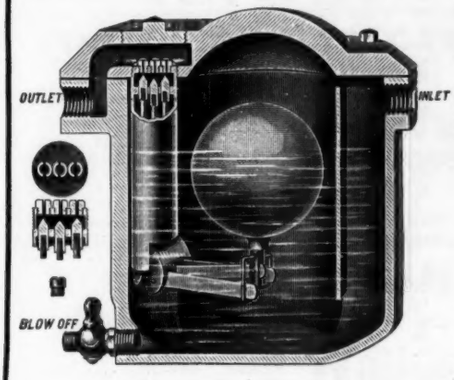

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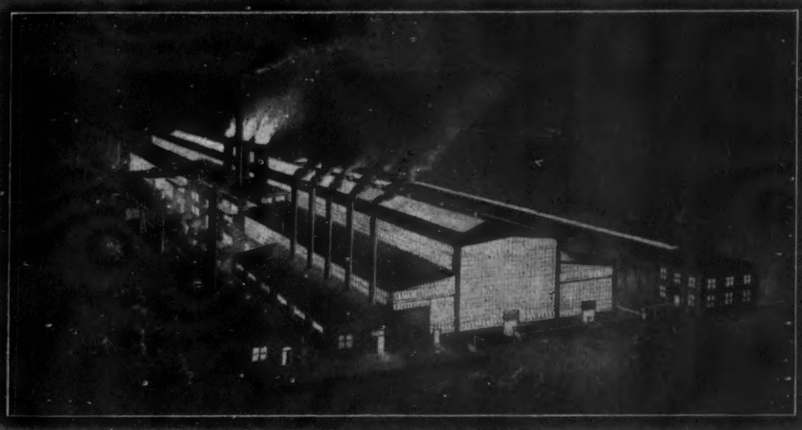

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General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., Pittsburg, Pa.

ASSAYERS.

Emmerton, F. A., Cleveland, O.
Peck, Francis J., & Co., Cleveland, O.

AXLES.

Carnegie Steel Co., Pittsburg, Pa.
Consolidated Mfg. Co., Toledo, O.
Cleveland City Forge & Iron Co., Cleveland, O.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Otis Steel Co., Ltd., Cleveland, O.

AXLES (Automobile).

Consolidated Mfg. Co., Toledo, O.

BALLS (Steel).

Auburn Ball Bearing Co., Rochester, N. Y.
Wyman & Gordon, Worcester, Mass.

BANDS.

Bassett-Presley Co., Cleveland, O.
Carnegie Steel Co., Pittsburg, Pa.
Globe Rolling Mill Co., Cincinnati, O.
Jones & Laughlin Steel Co., Pittsburg, Pa.
Pittsburg Steel Co., Pittsburg, Pa.

BARRELS (Tumbling).

Northern Engineering Works, Detroit, Mich.
Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.
Whiting Fdy. Equipment Co., Harvey, Ill.

BARROWS.

American Fork & Hoe Co., Cleveland, O.
Meehan Boiler & Cons. Co., Lowellville, O.
Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.
Wiener Co., Ernst, New York, N. Y.
Youngstown Car Mfg. Co., Youngstown, O.

BARS (Concrete Reinforcing).

American Sheet & Tin Plate Co., Pittsburg, Pa.
American Steel & Wire Co., Chicago, Ill.
Bassett-Presley Co., Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.

BARS (Iron and Steel).

American Bridge Co., New York City.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Bassett-Presley Co., Cleveland, O.
Bourne-Fuller Co., Cleveland, O.
Buffalo Steel Co., Tonawanda, N. Y.
Carnegie Steel Co., Pittsburg, Pa.
Globe Rolling Mill Co., Cincinnati, O.
Harvey, Arthur C., Boston, Mass.
Highland Iron & Steel Co., Terre Haute, Ind

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The Marshall Foundry Co.

Twenty-Eighth and Railroad Sts.,

PITTSBURGH, PA.

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ROSS-MEEHAN FOUNDRY CO.
Chattanooga, Tenn.

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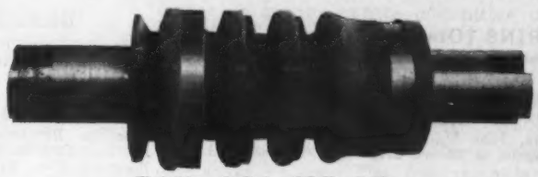
AIR FURNACE CASTINGS



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Canton, Ohio

BARS (Iron and Steel)—Continued.

Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburg, Pa.
Kratzer, W. N., & Co., Pittsburg, Pa.
LaBelle Iron Works, Steubenville, O.
Lackawanna Steel Co., New York City.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Pittsburg, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

BARS (Sheet).

Carnegie Steel Co., Pittsburg, Pa.
Lackawanna Steel Co., New York City.
LaBelle Iron Works, Steubenville, O.
Mudge, Edmund W., & Co., Pittsburg, Pa.
Republic Iron & Steel Co., Pittsburg, Pa.
Tennessee Coal, Iron & Railroad Co., Pittsburg, Pa.
United Steel Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Splice).

Carnegie Steel Co., Pittsburg, Pa.
Central Track Supply Co., Springfield, O.
Lackawanna Steel Co., New York City.

BATTERIES (Storage).

Westinghouse Machine Co., E. Pittsburg, Pa.

BEARINGS.

Auburn Ball Bearing Co., Rochester, N. Y.
Enterprise Metal Co., Syracuse, N. Y.
Jones & Laughlin Steel Co., Pittsburg, Pa.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Schultz, A. L., & Son, Chicago, Ill.

BELLOWS (Foundry).

Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.

BELTING.

Chicago Rawhide Mfg. Co., Chicago, Ill.

BELTING (Link).

Dodge Mfg Co., Mishawaka, Ind.
Jeffrey Mfg. Co., Columbus, O.
Ohio Malleable Iron Co., Columbus, O.
Port Huron Engine & Thresher Co., Port Huron, Mich.

BELTS (Conveying).

Jeffrey Mfg. Co., Columbus, O.

BENCHES (Draw and Wire).

Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York City.

BILLETS.

American Steel & Wire Co., Chicago, Ill.
Bassett, Presley Co., Cleveland, O.
Carnegie Steel Co., Pittsburg, Pa.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburg, Pa.
LaBelle Iron Works, Steubenville, O.
Lackawanna Steel Co., New York City.
Otis Steel Co, Cleveland, O.
Republic Iron & Steel Co., Pittsburg, Pa.
Stewart Iron Co., Ltd., Cleveland, O.
Taylor, N. & G., Co., Philadelphia, Pa.
Tennessee Coal, Iron & Railroad Co., Pittsburg, Pa.
United Steel Co., Canton, O.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.

BINS (Ore, Coal, Storage, Etc.).

Canton Boiler & Engineering Co., Canton, O.

BLOCKS (Chain).

Byers, John F., Machine Co., Ravenna, O.
Chisholm & Moore Mfg. Co., Cleveland, O.

BLOCKS (Cupola).

American Refractories Co., Chicago, Ill.
Harbison-Walker Refractories Co., Pittsburg, Pa.
Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co. Cleveland, O.
Stevens, F. B., Detroit, Mich.
Stowe-Fuller Co., Cleveland, O.

BLOOMS.

Carnegie Steel Co., Pittsburg, Pa.
Hillman, J. H., & Son, Pittsburg, Pa.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Chicago, Ill.
LaBelle Iron Works, Steubenville, O.
Lackawanna Steel Co., New York City.
National Tube Co., Pittsburg, Pa.
Tennessee Coal, Iron & Railroad Co., Pittsburg, Pa.
Wood, Alan, Iron & Steel Co., Philadelphia.

BLOWERS.

Cameron, A. S., Steam Pump Works, New York City.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
General Electric Co., Schenectady, N. Y.
Green Fuel Economizer Co., Matteawan, N. Y.
Smith, J. D., Fdry, Supply Co., Cleveland, O.

BOILERS.

Baird Machinery Co., Pittsburg, Pa.
Canton Boiler & Engrg. Co., Canton, O.
Chicago House Wrecking Co., Chicago, Ill.
Cooper, C. & G., Co., Mt. Vernon, O.
Davis, W. P., Machine Co., Rochester, N. Y.
Farrar & Trefts, Buffalo, N. Y.
Hathaway, A. G., & Co., Cleveland, O.
Industrial Works, Bay City, Mich.
Lake Erie Engine Works, Buffalo, N. Y.
Meehan Boiler & Construction Co., Lowellville, O.
Petroleum Iron Works Co., Sharon, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Randle Machinery Co., Cincinnati, O.
Riter-Conley Mfg. Co., Pittsburg, Pa.
Schultz, A. L., & Son, Chicago, Ill.
Sharon Boiler Works, Sharon, Pa.
Standard Boiler & Plate Iron Co., Niles, O.
Struthers-Wells Co., Warren, Pa.
Toomey, Frank, Philadelphia, Pa.
Vandyck-Churchill Co., New York City.
Wickes Bros., Pittsburg, Pa.

BOLTS.

American Bridge Co., New York City.
Bassett-Presley Co., Cleveland, O.
Chicago Screw Co., Chicago, Ill.
Graham Nut Co., Pittsburg, Pa.
Jones & Laughlin Steel Co., Pittsburg, Pa.
Milton Mfg. Co., Milton, Pa.
National Bolt & Nut Co., Pittsburg, Pa.
Oliver Iron & Steel Co., Pittsburg, Pa.
Republic Iron & Steel Co., Pittsburg, Pa.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Joseph T., & Son, Chicago, Ill.
Steel Car Forge Co., Pittsburg, Pa.
Upson Nut Co., Cleveland, O.

BOOKS.

Penton Publishing Co., Cleveland, O.

BOXES (Annealing).

Canton Boiler & Engrg. Co., Canton, O.
Meehan Boiler & Construction Co., Lowellville, O.
Union Steel Casting Co., Pittsburg, Pa.
United Engineering & Fdy. Co., Pittsburg, Pa.
Wilfong Bros., Philadelphia, Pa.

BOXES (Charging).

Meehan Boiler & Construction Co., Lowellville, O.
Morgan Engineering Co., Alliance, O.
Variety Iron & Steel Works Co., Cleveland, O.

BRACES (Rail).

Central Track Supply Co., Springfield.

BRAZING (Custom).

Champion Engineering Co., Cleveland, O.

BREAKERS (Casting).

Curtis & Co. Mfg. Co., St. Louis, Mo.
Whiting Foundry Equipment Co., Harvey, Ill.

BREAKERS (Circuit).

General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., Pittsburg, Pa.

BRICK AND CLAY (Fire).

American Refractories Co., Joliet, Ill.
Ashland Fire Brick Co., Ashland, Ky.
Bickford Fire Brick Co., Pittsburg, Pa.
Blackwell, Geo. G., Sons & Co., Liverpool.
Clearfield Fire Brick Co., Clearfield, Pa.
Dover Fire Brick Co., Cleveland, O.
Harbison-Walker Refractories Co., Pittsburg, Pa.
Kenworthy Engineering Co., Waterbury, Conn.
Niles Fire Brick Co., Niles, O.
Scioto Fire Brick Co., Sciotoville, O.
Stowe-Fuller Co., Cleveland, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Stevens, F. B., Detroit, Mich.
Swank's Sons, Hiram, Johnstown, Pa.

BRICK (Silica, Magnesia, Chrome).

American Refractories Co., Joliet, Ill.
Harbison-Walker Refractories Co., Pittsburg, Pa.
Soisson, Jos., Fire Brick Co., Connellsville, Pa.
Stowe-Fuller Co., Cleveland, O.

BRIDGES AND VIADUCTS (Steel).

American Bridge Co., New York City.
Bellefontaine Bridge & Steel Co., Bellefontaine, O.
Interstate Engineering Co., Cleveland, O.
McClintic-Marshall Construction Co., Pittsburg, Pa.

BRUSHES (Foundry).

Obermayer, S., Co., Cincinnati, O.
Smith, J. D., Fdry. Supply Co., Cleveland, O.

BUCKETS (Clam Shell).

Interstate Engineering Co., Bedford, O.
Macbeth Iron Co., Cleveland, O.
McMyler Mfg. Co., Cleveland, O.
Wellman-Seaver-Morgan Co., Cleveland, O.

BUCKETS (Elevator and Hoisting).

Bartlett, C. O., & Snow Co., Cleveland, O.
Brown Hoisting Machinery Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
McMyler Mfg. Co., Cleveland, O.
Ohio Malleable Iron Co., Columbus, O.
Wellman-Seaver-Morgan Co., Cleveland, O.

BUGGIES (Wire and Nail Mill).

Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BULLDOZERS.

Cleveland Punch & Shear Works Co., Cleveland, O.
Long & Allstatter Co., Hamilton, O.
National Machinery Co., Tiffin, O.

BULLDOZERS (Hydraulic).

Chambersburg Engineering Co., Chambersburg, Pa.

BURNERS (Fuel Oil).

Burns Oil-Fuel Furnace Co., Fort Plain, N. Y.
Petroleum Iron Works Co., Sharon, Pa.
Rockwell Furnace Co., New York, N. Y.

CABLEWAYS.

McClintic-Marshall Construction Co., Pittsburg, Pa.

CARS (Annealing, Pig Iron, Etc).

Chase Foundry & Mfg. Co., Columbus, O.
Smith, J. D., Fdry, Supply Co., Cleveland, O.
Whiting Foundry Equipment Co., Harvey, Ill.
Youngstown Car Mfg. Co., Youngstown, O.

CARS (Billet).

Atlas Car & Mfg. Co., Cleveland, O.
Chase Foundry & Mfg. Co., Columbus, O.
Watt Mining Car Wheel Co., Barnesville, O.
Youngstown Car Mfg. Co., Youngstown, O.

CARS (Charging).

Atlas Car & Mfg. Co., Cleveland, O.
Chase Foundry & Mfg. Co., Columbus, O.
Variety Iron & Steel Works Co., Cleveland, O.
Youngstown Car Mfg. Co., Youngstown, O.

CARS (Coal, Coke and Mining).

Jeffrey Mfg. Co., Columbus, O.
Massillon Fdry. & Machine Co., Massillon, O.
Watt Mining Car Wheel Co., Barnesville, O.
Wiener Co., Ernst, New York, N. Y.
Youngstown Car Mfg. Co., Youngstown, O.

CARS (Derrick).

Byers, John F., Machine Co., Ravenna, O.
Watt Mining Car Wheel Co., Barnesville, O.

CARS (Electrically Driven).

Atlas Car & Mfg. Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Westinghouse Machine Co., E. Pittsburg, Pa.

CARS (Industrial).

Atlas Car & Mfg. Co., Cleveland, O.
Chase Foundry & Mfg. Co., Columbus, O.
Watt Mining Car Wheel Co., Barnesville, O.
Wiener Co., Ernst, New York, N. Y.
Whiting Foundry Equipment Co., Harvey, Ill.
Youngstown Car Mfg. Co., Youngstown, O.